

CoL Continuum of eLearning

The Next Evolution of Joint Training on JKO

.....

Continuum of eLearning: 2012 Project Summary Report



October 2012

Joint Training, Joint Staff J7

Authored by David T. Fautua, Sae Schatz, Andrea Taylor, Emilie Reitz, Kathleen Bartlett, and John Killilea

REPORT DOCUMENTATION PAGE

**Form Approved
OMB No. 0704-0188**

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE (DD-MM-YYYY) 10-30-2012			2. REPORT TYPE Technical Report		3. DATES COVERED (From - To) November 2011 – August 2012	
4. TITLE AND SUBTITLE Continuum of eLearning: 2012 Project Summary Report			5a. CONTRACT NUMBER N00140-06-D-0060			
			5b. GRANT NUMBER			
			5c. PROGRAM ELEMENT NUMBER			
6. AUTHOR(S) David T. Fautua, Sae Schatz, Andrea Taylor, Emilie Reitz, Kathleen Bartlett, and John Killilea			5d. PROJECT NUMBER			
			5e. TASK NUMBER			
			5f. WORK UNIT NUMBER			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) DSCI MESH Solutions 12601 Research Parkway, Orlando, FL 32826			8. PERFORMING ORGANIZATION REPORT NUMBER			
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Joint Training Joint Staff J7 Suffolk, VA 23435			10. SPONSOR/MONITOR'S ACRONYM(S) J7, Joint Staff			
			11. SPONSOR/MONITOR'S REPORT			
12. DISTRIBUTION / AVAILABILITY STATEMENT						
13. SUPPLEMENTARY NOTES						
14. ABSTRACT This report outlines a variety of challenges associated with joint military training and education. It begins by detailing gaps in collective (live) training and discussing limitations associated with online learning. These limitations were uncovered through reviews of the literature, as well as interviews with military stakeholders and reactions surveys from military online learners. Next, it outlines a phased approach to address the gaps and limitations of individual, team, and collective training through a Joint Event Life Cycle (JELC) optimized blended learning approach. This approach, called the Continuum of eLearning (CoL), represents both a training capability and a systematic methodology for enhancing military online learning. The report describes the CoL approach and features, highlighting those functions that were implemented in 2012 as part of Version 1.0, as well as describing future plans for V2.0 and V3.0. Finally, the report also documents the results of the beta test of CoL V1.0, which was tested during the PANAMAX 2012 joint and multinational training event. The beta test revealed that demographic variables, such as rank and service, affected overall knowledge levels; however, when these were controlled for, the CoL courses had a positive impact on personnel's knowledge and joint attitudes. The surveys that asked about participants' past and present experiences with online learning also provide a set of requirements for future versions of the CoL .						
15. SUBJECT TERMS Distributed learning, e-learning, web-based learning, blended learning, training and education, empirical research, joint training						
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 57	19a. NAME OF RESPONSIBLE PERSON David T. Fautua	
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U			19b. TELEPHONE NUMBER (include area code) 1-757-203-7767	

Executive Summary.....	i	
Gaps and Opportunities.....	i	
Collective Training.....	i	
Online Learning	ii	
Continuum of <i>e</i> Learning.....	ii	
CoL Components.....	iii	
CoL Version 1.0.....	iii	
CoL V1.0 Beta Testing.....	iii	
Recommendations.....	iv	
CoL Next Steps.....	vi	
Gaps & Opportunities	1	
Collective Training	1	
1. “Untrained” Staff.....	2	
2. Stovepiped Training	2	
3. Service-Specific Mindsets	2	
4. Insufficient Constructive Insights	2	
5. Unknown Retention Between Events	3	
Online Learning.....	3	
Military e-Learning Challenges	4	
e-Learning Best Practices.....	5	
1. Enhance Learning Content	5	
2. Enhance Online Assessments	7	
3. Enhance Motivation	8	
4. Enhance Relevance	10	
5. Enhance Usability.....	11	
Chapter Summary.....	12	
CoL Design and Vision.....	13	
CoL Components	13	
Individual Online Courses.....	13	
Staff Online Part-Task Training.....	14	
Blended Learning and Training.....	14	
Concept of Operations.....	15	
Individual Online Learning	15	
Staff Online Part-Task Training.....	16	
Blended Learning and Training Processes	18	
Enhanced Development Processes.....	18	
Enhanced Execution Processes	18	
CoL Version 1.0	18	
Enhanced Learning Content	18	
Enhanced Online Assessments	19	
Enhanced Motivation	19	
Enhanced Relevance	20	
Enhanced Usability.....	20	
Chapter Summary.....	20	
CoL V1.0 Beta Test.....	21	
Method.....	21	
PANAMAX Exercise	21	
Research Design	21	
Measures	22	
Participants	25	
CoL V1.0 Beta Test Components	25	
Results	26	
Course Completion Data.....	26	
Content Knowledge Test	26	
Opinions Towards Previous e-Learning Survey.....	27	
Post-CoL Reactions Survey.....	27	
Comparison of Previous e-Learning to CoL	28	
Joint Mindset Survey	29	
Post-Academics Reactions Survey	29	
Post-Exercise Reactions Survey	29	
Free-Response Qualitative Results	29	
Discussion	31	
Content Knowledge Test	31	
Opinions Towards Online Learning and Post-CoL	31	
Online Learning Reactions	31	
Attitudes Towards Joint Operations	32	
Post-Academics and Post-Exercise Reactions	32	
Suggested Revisions to CoL V1.0.....	32	
Learning Content	32	
Online Assessments	33	
Motivation to Use	34	
Relevance	34	
Usability.....	34	
Recommendations	35	
Recommendations.....	35	
1. Revise specifications for blended learning	35	
2. Develop blended learning-training packages	35	
3. Develop an automated data “dashboard”	36	
4. Improve assessment development	36	
5. Implement adaptive e-learning	36	
6. Utilize an upgraded LCMS	37	
7. Increase e-learning’s usability and reliability	37	
8. Enhance course content review processes.....	38	
9. Develop meaningful system metrics.....	38	
10. Test and evaluate the system	38	
Appendix.....	39	



EXECUTIVE SUMMARY

This report describes an initiative, called the Continuum of eLearning (CoL), which addresses some of the gaps and limitations of individual and collective training by providing blended-learning training packages to better integrate online learning activities into the Joint Exercise Live Cycle. The CoL is a web-based training package, developed by the Joint Training of the Joint Staff J7, and it is intended to represent the “next evolution” of training on JKO.¹

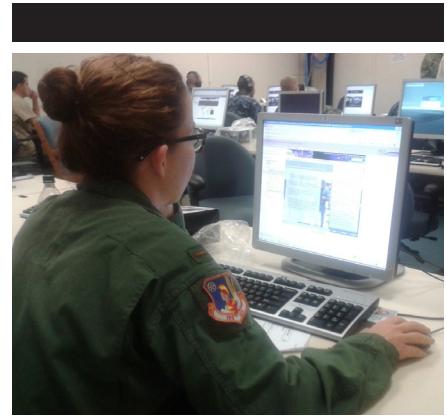
Gaps and Opportunities

Collective Training

Each year, the Joint Staff J7, coordinates dozens of large-scale joint and coalition training events, and military leaders are constantly looking for ways to enhance the events’ training outcomes. In particular, joint training personnel and the literature have identified five areas that could be improved upon:

1. There are often significant numbers of “untrained” staff. It is not uncommon for staff members to miss a collective training exercise because of late assignment, in country duties, or other logistical limitations. These personnel remain “untrained” since no alternative mechanisms currently substitute for a collective event. This creates weaknesses in the shared knowledge-base of operational staffs.

2. Training and education events lack blending. Despite the quality of training offered, it is currently executed in stovepipes, with little correspondence among individual training concepts, joint aca-



PANAMAX 2012 participants complete CoL courses prior to the start of the collective exercise (July 2012)

SECTION SUMMARY

The Continuum of eLearning (CoL) is a methodology and capability that blends online learning with joint collective training.

CoL 1.0 was developed in 2012 and tested at PANAMAX.

Joint staff members’ subjective reactions and objective learning effectiveness scores were significantly higher in the CoL (experimental) condition as compared to their previous experiences and the control condition, respectively.

¹ Joint Knowledge Online (JKO) develops and delivers online joint training to prepare and assist individuals to support joint and coalition operations. JKO is the DoD’s unique and authoritative capability for providing operationally relevant and globally accessible training to support individual joint preparedness and exercises. Combatant commands are dependent on JKO as an integral component of their individual joint training plans.

demics, and collective exercise objectives.

3. Personnel possess Service-specific mindsets.

Personnel assigned to a joint billet may not have served in any joint position before. Consequently, they may exhibit Service-centric attitudes that initially inhibit their effectiveness in their joint roles.

4. Commanders and observer-trainers (OTs) could make use of more detailed, diagnostic outcome data. Targeted, objective assessment of personnel's cognitive capacities is rarely conducted across the entire cohort of trainees. Having enhanced individual readiness data would give commanders more constructive insights into their staff's preparedness, and observer-trainers (OTs) insight into what aggregate knowledge gaps they should address during various training activities.

5. It is unclear how much training personnel retain between events. Staffs are constantly changing, due to routine rotations and re-assignments. As such, there is an ongoing struggle to maintain a high "band of excellence" in the experience and expertise of the permanent staff. In addition to this unique difficulty, joint training personnel also face the conventional challenge of training transfer. It is unclear how much training transfers to individuals during a collective training event, as well as how much of that transferred knowledge personnel actually retain between events.

Online Learning

Supplementary online learning seems like an obvious solution to the challenges outlined above. However, despite the potential benefits of well-designed e-learning, online courses *in practice* not possess a sufficient level of rigor and this can negatively affect their effectiveness, utility, and appeal.

As part of this effort's front-end analysis, we conducted structured interviews with seven active duty and government civilian stakeholders associated with the major military e-learning enterprises in the Air Force, Army, Navy, Marine Corps, and Joint Staff. These subject-matter experts offered informed opinions about military online courses,

Table I.1. Summary of gaps in military collective training and ways that online and blended learning can help address each issue.

Issue	Resolution Strategy
"Untrained" Staff Staff members frequently miss the joint exercise before a Joint Task Force forms (e.g., due to late assignment or in-country duties)	24/7 e-Learning Access An obvious benefit of e-learning is that it allows 24/7 access; so, staff can receive some training, even if they miss the collective exercise
Stovepipe Events Often, learning opportunities are executed in stovepipes, without explicit links to related training events	Blended Learning Use blended learning processes to help ensure that related learning opportunities are integrated together
Service Mindsets When first assigned to a joint billet, Service members may lack joint mindsets, which initially inhibits their effectiveness in joint roles	Contextualize Content Use narrative and humanized instructional interventions to make joint doctrine, culture, and vocabulary more relatable to online learners
Outcome Data Commanders and OTs could make use of more detailed, more diagnostic training outcome data	Data Dashboard Use better, more diagnostic measures to compile meaningful individual readiness data and then translate this for OTs and commanders
Retention Staff members' skills and knowledge may decay between training events, and each Staff member will likely require a unique remediation plan	Current and Targeted Provide enduring online content, keep it concurrent with real-world operations and best practices, and tailor course assignments to each student's learning needs

and they suggested that military e-learning could be improved in areas such as the sophistication and specificity of content, the effectiveness of learning assessments, students' motivation to use the online courseware, courses' seeming lack of relevance, and courses' lack of usability.

Continuum of eLearning

The CoL was initiated to address the gaps in joint collective training while also improving upon the delivery of online learning. The CoL represents both a capability (i.e., the instructional content) and a methodology (i.e., the implementation approach) for bolstering joint training. It employs

research-based best practices for blended learning to better support adult education and training, improve learning outcomes, and enhance students' motivation to learn online.

CoL Components

As stated above, the CoL represents both an instructional capability as well as a systematic approach for developing online courses, blending them with small-group and collective training events, and ensuring that instructional best practices are continuously infused. More specifically, the CoL includes:

- Self-paced, e-learning courses
- Small-group online simulation
- Strategies for blending learning/training
- Strategies for enhancing development
- Strategies for enhancing execution

CoL Version 1.0

Version 1.0 of the CoL was implemented in 2012 through JKO. To date, CoL courses include content from the 100 (i.e., "basic") and 200 (i.e., "intermediate") levels of the Joint Force Command curriculum, as implemented in support of Combatant Command and Joint Task Force exercises. CoL V1.0 also incorporates the following best practices in order to better support student learning:

1. Emphasize higher-order learning
2. Use pre-tests for performance adaptation
3. Incorporate higher-order assessments
4. Use formative and summative assessments
5. Employ mastery learning strategies
6. Incorporate historical vignettes
7. Create higher-levels of interactivity
8. Ensure better alignment

CoL V1.0 Beta Testing

Version 1.0 of the CoL was tested at PANAMAX 2012, a US Southern Command multinational training exercise. Data collection for this beta test took place 20 May–17 Aug 2012 in Mayport, Doral (i.e., Miami), and Suffolk. Approximately

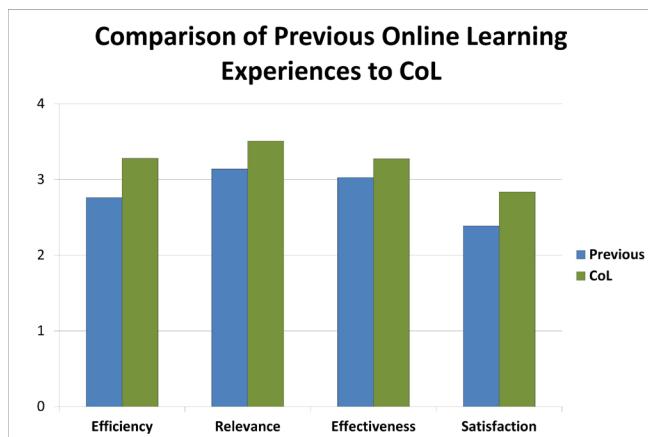


Figure 1. Comparison of previous online learning experiences to participants' CoL reactions. Participants rated their CoL experiences more positively than their previous military e-learning experiences.

200 US personnel from the Tier I or Tier II staffs participated. Half of the participants (i.e., the experimental group) completed the following online CoL courses prior to the event:

- JFC 100 Joint Operations Planning
- JFC 100 Interorganizational/Multinational
- JFC 200 Interorganizational Coordination

Throughout the beta test, the research team evaluated the efficacy of the CoL through a multi-part experiment, documenting the learning effectiveness of the courses as well as their usability, motivational effects, operational relevance, and ability to engender a "joint mindset." Just over 100 participants ($n = 106$) completed the experimental CoL content and some portion of the experimental battery. The others ($n = 90$) participated as a control group. Both groups completed knowledge tests, joint mindset questionnaires, and reactions surveys.

Participant demographics. Most participants were Sailors (about 42%), but Airmen (27%), Soldiers (25%), and Marines (6%) were also represented. Participants were nearly equally divided between active and reserve components, and most participants held mid-level staff ranks (E6-E7 or O3-O4; about 59% of participants), although higher (30%) and lower (11%) ranks were also present.

Differences by rank and Service. Differences based upon rank and Service were found on the

knowledge questionnaire and post-course reactions survey. US Army personnel achieved higher test scores as compared to personnel from the other Services, and as expected, higher-ranking personnel also earned better test scores. Lower ranking personnel, however, rated the online courses more favorably. Based upon participants' free-response comments, it appears that higher-ranking participants saw the need for the online courses but felt like they already had a working knowledge of the content.

Previous online learning experiences. Before completing any CoL courses, participants were asked about their previous online learning experiences. Overall, participants rated their pre-CoL online learning experiences slightly below "neutral" on a five-point scale ($M = 2.87$, $SD = 0.93$).

Reaction (Kirkpatrick's Level 1). After taking the three CoL courses, experimental participants completed surveys regarding the perceived efficiency, relevance, and effectiveness of the e-learning as well as their overall satisfaction with the learning experience. Participants rated the CoL courses slightly above "neutral" on a five-point scale ($M = 3.24$, $SD = 0.88$). Paired samples t -tests indicated statistically significant differences between the participants' previous online learning experiences and the CoL online experience (see Figure 1). Although participants' reactions to the CoL courses remained lukewarm, these courses were rated more highly than the online courses the participants had previously experienced.

Learning (Kirkpatrick's Level 2). All participants completed identical knowledge tests. Outcomes from a univariate between-subjects ANCOVA, controlling for rank and Service, indicate that there is a statistically significant difference between the control ($n = 47$, $M = 48.83\%$) and experimental ($n = 57$, $M = 59.09\%$) group scores, $F(2, 48) = 8.58$, $p = .001$. Participants who completed the CoL scored, on average, 21% better on the knowledge test versus participants in the control group (see Figure 2).

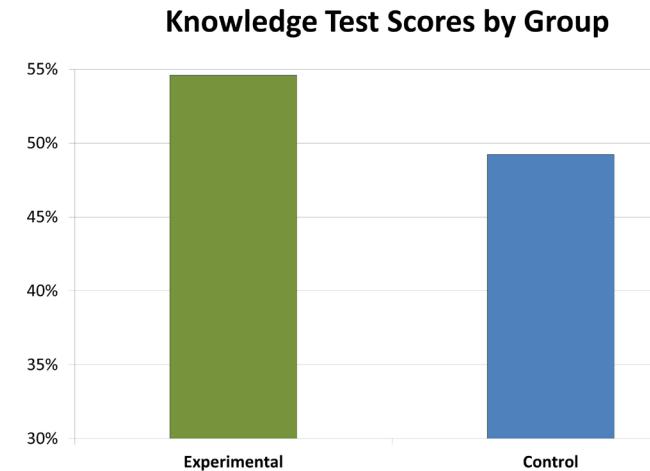


Figure 2. Comparison of experimental (CoL) and control group participants' knowledge scores reveals that the experimental group scored significantly higher on learning outcomes.

Recommendations

As a result of the CoL V1.0 research and development initiative, the evaluation team compiled the following recommendations for enhancing joint individual and collective, training and education. See Table 1 for a summary.

1. Revise e-learning specifications for blended learning. This initiative uncovered valuable recommendations about how to best design joint e-learning and blended learning experiences in support of collective training. These recommendations should be formalized into official instructions for relevant stakeholders, such as instructional systems designers (ISDs) and observer-trainers (OTs).

2. Develop blended learning-training packages. To facilitate blended learning, blended learning-training packages should be developed that include intentional linkages, cross references, and blending guidance for OTs. To fully support this recommendation, OTs will also require training on how best to use the new blended learning resources.

3. Develop an automated data "dashboard" to support blended learning. We recommend the development of a data "dashboard" that automatically analyzes personnel's learning outcomes (from

Table 2. Summary of high-level recommendations for the overall continuum of joint learning and training

Recommendations

1. Revise e-learning specifications for blended learning
2. Develop blended learning-training packages
3. Develop a blended learning data “dashboard”
4. Improve CoL assessment creation and validation
5. Implement adaptive e-learning
6. Utilize an upgraded content management system
7. Increase e-learning’s usability and reliability
8. Update and enhance course content review process
9. Develop meaningful system metrics
10. Test and evaluate the system

the online database) and presents easily interpretable, dynamic, and interactive visual depictions of the aggregate of those learning outcomes, as well as usable quantitative scores. The dashboard should allow OTs and commanders to easily view *relevant* performance and reaction scores. By providing an overview of aggregate student performance to the OTs prior to the execution of JELC Academics, for instance, they can deliver a training package that is more tailored to the training audience’s knowledge level.

4. Improve the development and validation processes for assessment within CoL courses. ISDs, OTs, and other training stakeholders recognize the importance of creating good assessments; however, many times stakeholders are too busy to adequately develop those assessments. Revised processes must better support those stakeholders and content owners, while ensuring that courses include reliable, valid, and diagnostic assessments, designed for both formative and summative evaluation of learning outcomes.

5. Implement adaptive e-learning. Tailoring instructional material and delivery mechanisms to better meet students’ unique needs enhances learning effectiveness, efficiency, and satisfaction. In e-learning, the software can automatically adapt the instruction to approach each learner uniquely. For instance, simple mechanisms can dynamically ad-

just the content, learning progression, or instructional activities in an online course based upon variables, such as rank, duty assignment, performance on a course exam, or the specific themes of an upcoming exercise.

6. Utilize an upgraded content management system. To support the adaptive learning mechanisms discussed in the previous recommendation, the learning content management system must be upgraded beyond the scope of many older DoD content management systems. Similar upgrades are required to enable the delivery of more sophisticated assessments (recommendation 4), associated feedback, and the evaluation and display of assessment data via the data dashboard (recommendation 3).

7. Increase e-learning’s usability and reliability. In addition to utilizing a system with expanded capabilities, that system must also have high usability and reliability. This upgraded content management system must also integrate with the Service’s learning management systems, as well, in order to ensure that training outcomes are shared across platforms.

8. Update and strengthen the course content review process. A more robust process for reviewing e-learning (and SGST scenario) content and delivery tactics is needed in order to ensure all courses meet a consistently high level of quality. We recommend incorporating OTs and other subject-matter experts (e.g., doctrine specialists) into the current review process so that courses better support individual learning—and collective training—goals.

9. Develop meaningful system metrics. As Joint Training adopts these recommendations and evolves into its “next evolution,” it is prudent to develop associated systematic measures of performance, measures of effectiveness, and return-on-investment criteria to monitor the immediate progression of this effort and to evaluate long-term system performance.

10. Test and evaluate the system. Finally, as good system engineering practice demands, the changes recommended in this report should be iteratively

designed, developed, tested, and evaluated. As new CoL components are developed, those features should be evaluated against the CoL V1.0 beta test data. Also, a periodic (e.g., annual) test and evaluation plan should be implemented to collect ongoing data that addresses the new system-level metrics described in recommendation 9.

CoL Next Steps

Based upon the success of CoL V1.0, Joint Training is now pursuing development of CoL V2.0, which is scheduled to be completed in 2013. Version 2.0 will expand the content of the V1.0 CoL, incorporating additional 100- and 200-level courses, as

well as 300-level joint fundamentals content. V2.0 will also include more sophisticated, more detailed metrics as well as visualizations of the outcome data designed (via the “data dashboard”) to give commanders and training personnel additional insights into the staff’s individual cognitive readiness. Finally, V2.0 will incorporate a peer-learning web-based training simulation, called the Joint Operations Center Simulation (JOCSIM), using the existing Small Group Scenario Trainer to provide the technical capability. After students complete their individual courses (i.e., the 100–300 level courses), they will be able to interact with fellow personnel in the JOCSIM. These enhancements will be tested during a 2013 collective training event, and detailed in a post-event supplementary report.



GAPS & OPPORTUNITIES

This report describes an initiative, called the Continuum of eLearning (CoL), which addresses some of the gaps and limitations of individual and collective training by providing blended learning—training packages to better integrate online learning activities into the Joint Exercise Live Cycle. The CoL is a web-based training package, developed by Joint Training (Joint Staff J7), and it is intended to represent the “next evolution” of training on JKO.¹

This section describes the demand signal for the CoL. It lists five opportunities for improving collective joint training and then describes how individual e-learning can help achieve those improvements. However, practical limitations in military e-learning often reduce its effectiveness and, in turn, limit its ability to sufficiently meet collective training needs. Consequently, this section ends with a discussion about the gaps in military e-learning and the established best practices for addressing them.

Collective Training

Each year, the Joint Staff J7 coordinates dozens of large-scale training events for the Combatant Commands (CCMDs). These annual or semi-annual exercises help prepare personnel at the operational staff level for their duties at CCMDs and at the Joint Task Forces (JTFs) that support them. Despite the effectiveness of these training events, military leaders are constantly looking for ways to enhance their training outcomes. In particular, joint training personnel have identified five areas that could be improved upon.



U.S. and Colombian personnel in the joint tactical operations center during PANAMAX 2012 (Photo by MSG Kevin Doheny)

SECTION SUMMARY

The CoL seeks to address five gaps related to collective training and staff operations: (1) staff members missing out on collective training; (2) lack of integration among training events; (3) lack of joint mindsets; (4) insufficient individual outcome data; and (5) knowledge decay between training events.

The CoL is addressing these gaps via e-learning; however, to be effective, the CoL must also address practical limitations frequently encountered in military e-learning.

¹ Joint Knowledge Online (JKO) develops and delivers online joint training to prepare and assist individuals to support joint and coalition operations. JKO is the DoD’s unique, authoritative capability that provides operationally relevant and globally accessible training to support individual joint preparedness and exercises. Combatant commands are dependent on JKO as an integral component of their individual joint training plans.

I. “Untrained” Staff

Forming a joint headquarters staff presents unique logistical challenges, particularly from the personnel and manning perspective. Relevant here is the challenge of ensuring that personnel maximize the benefit from—and can actually attend—training events.

Joint billets are often filled with individual augmentees from across the Services’ reserve components. They have competing duties, constrained schedules, and a “lack of dwell time,” which “inhibits forces from conducting the training necessary to carry out the full range of military operations and to be prepared for a wider range of contingencies.”² Thus, despite access to well-planned joint training events, personnel are often left to prepare just beforehand; they may struggle during training to learn the foundational joint concepts, rather than use that time to hone more advanced skills. In other words, some personnel may not reap the full benefits from their participation in joint exercises.

This challenge is magnified further if the augmentees or late-arriving staff members miss the collective training event altogether. Commanders have deployed with portions of their Joint Manning Document (JMD) still unfilled.³ One JTF even reported deploying with less than 50% of its JMD.⁴ When this occurs, it means that a significant portion of a joint staff misses the opportunity to train with the unit prior to deployment and, therefore, receives less preparation for their deployment.⁵

While every effort is made to ensure the quality and authenticity of training, high percentages of joint staffs still do not receive the full advantage of

their pre-deployment exercises. These personnel remain “untrained” since no alternative mechanisms currently substitute for the collective events. This creates weaknesses in the shared knowledge-base of operational staffs.

2. Stovepiped Training

Large-scale joint exercises primarily emphasize in-residence collective training versus a blend of individual and collective approaches. Despite the high quality of the training offered, the various learning activities are currently executed in stovepipes, with little correspondence among individual training concepts, joint academics, and collective exercise objectives. To individual trainees, the flow between the stages of training can seem disjointed, and each component may appear to lack context.

3. Service-Specific Mindsets

Personnel assigned to a joint billet may not have served in any joint position previously. They bring with them their years of Service experience but not necessarily an understanding of the larger context of joint, interorganizational, and multinational operations. They may not know how to function in a joint manner, and they may not yet fully understand the advantages of their sister Services, the possible benefits of Service integration, or the joint doctrinal processes for planning and integration.⁶ Consequently, personnel may exhibit Service-centric attitudes that initially inhibit their effectiveness in their new joint roles.

4. Insufficient Constructive Insights

Targeted, objective assessment of personnel’s cognitive capacities is rarely conducted across the entire cohort of trainees. This causes problems because individual augmentees and new arrivals may carry with them unforeseen gaps in critical joint knowledge; alternatively, they could possess life experiences that would distinguish them as high-utility

2 Chairman of the Joint Chiefs of Staff (2007). *Joint training manual for the armed forces of the United States* (CJCSM 3500.03B). See p. 3.

3 The JMD is a record of assigned personnel and billets.

4 Wright, D. P., & Reese, T. R. (2008). *On Point II: Transition to the New Campaign*. Combat Studies Institute Press, US Combined Arms Center. Fort Leavenworth, Kansas.

5 “It’s not just that JMD billets go unfilled,” one of the PANAMAX Observer-Trainers explained to the CoL researchers. “Often someone isn’t qualified for their assigned billet, and unless the staff interviews them prior to or just after arrival, best use of skills available is delayed until a bad operational result highlights the problem.”

6 Menaker, E., MacDonald, J., Hendrick, A., & O’Conner, D. (2006). *Training a Joint and Expeditionary Mindset*. United States Army Research Institute for the Behavioral and Social Sciences

officers. Joint training stakeholders must improve the way that they “track joint training received by their individual personnel so as to improve awareness and application of joint trained personnel.”⁷ In other words, “we must develop more effective ways to improve and assess joint and unit readiness.”⁸

Having enhanced individual readiness data would give commanders more detailed, constructive insights into staff members’ preparedness, and observer-trainers (OTs) insight into what aggregate knowledge gaps can be covered through training, such as pre-exercise academics. Further, knowing this information shortly after a Service member joins a command would speed his/her integration into the staff and facilitate more efficient operations, overall.

5. Unknown Retention Between Events

Staffs are constantly changing due to routine rotations and reassessments. Consequently, there is an ongoing struggle to maintain a high “band of excellence” in the expertise of the permanent staff and to “ensure continuous Joint Mission Essential Task List (JMEL) refinement to reflect current readiness, lessons learned, joint experimentation, capabilities development, training, and joint military education programs.”⁹

In addition to this unique difficulty, joint training personnel also face the conventional challenge of training transfer. It is unclear how much training transfers to individuals during a collective training event, as well as how much of that transferred knowledge personnel retain between events. To compound the challenge, each staff member is likely to retain distinct parts of the training and, consequently, will require remediation on different components of it.

Online Learning

⁷ Chairman of the Joint Chiefs of Staff (2011). *2012–2015 Chairman’s Joint Training Guidance* (CJCSN 3500.01), p. 4

⁸ Chairman of the Joint Chiefs of Staff (2007). *Joint training manual for the armed forces of the United States* (CJCSM 3500.03B), p. 4

⁹ CJCS, *2012–2015 Chairman’s Joint Training Guidance*, p. 2

Table 1.1. Summary of gaps in military collective training and ways that online and blended learning can help address each issue.

Issue	Resolution Strategy
“Untrained” Staff	24/7 e-Learning Access Staff members frequently miss the joint exercise before a JTF forms (e.g., due to late assignment or in-country duties)
Stovepipe Events	Blended Learning Often, learning opportunities are executed in stovepipes, without explicit links to related training events
Service Mindsets	Contextualize Content When first assigned to a joint billet, Service members may lack joint mindsets, which initially inhibits their effectiveness in joint roles
Outcome Data	Data Dashboard Commanders and OTs could make use of more detailed, more diagnostic training outcome data
Retention	Current and Targeted Staff members’ skills and knowledge may decay between training events, and each Staff member will likely require a unique remediation plan

Supplementary online courses and blended learning approaches seem like obvious solutions for the challenges outlined above. Using e-learning to help bolster collective training also follows the Chairman’s guidance.¹⁰

Online courses are a good solution because

¹⁰ The Chairman advises “educators, trainers, commanders, learning support elements, information-providers, and information managers [to] use a myriad of existing techniques, resources, and technologies to facilitate achieving specific learning objectives.” He goes on to write, “Joint Knowledge Online (JKO) provides a Joint Individual Training Toolkit of web enabled individual and small group training products and services, with a knowledge management capability that has real-time reach back between individual warfighters, operational staffs, and key information sources...” See CJCS, *Joint training policy and guidance for the armed forces of the United States*, p. A-7

Table 1.2. Barriers to effectiveness in military e-learning, summarized from knowledge elicitation with stakeholders. This table reflects general issues with e-learning; it does *not* specifically reflect JKO or any other learning management system, in particular.

Category	Topic
Learning Content	<ul style="list-style-type: none"> • Course content may lack specificity (i.e., the content is “fuzzy” and overly general) • Courses focus too heavily on lower-order thinking (e.g., declarative knowledge)
Assessments	<ul style="list-style-type: none"> • Course assessments lack depth and/or are poor quality • Courses fail to include useful formative assessments • Courses fail to associate meaningful feedback with assessments • Courses have low minimum standards of performance (i.e., they do not require full mastery)
Motivation to Use	<ul style="list-style-type: none"> • Insufficient time given during duty-hours to complete assigned e-learning courses • Learners have “just check-the-box as quickly as possible” attitudes (i.e., task-focused goal orientation) • Learners perceive answer-sharing as acceptable • Online courses lack engaging content, interactivity, and/or relevant multimedia • Students must repeat known material frequently (e.g., annual completion of same compliance course)
Relevance	<ul style="list-style-type: none"> • Perceived lack of relevance of online learning for actual duties • Online courses lack transparent alignment to doctrine (e.g., UJTL) • Online courses lack alignment to future training or events • Online courses lack concurrency with real-world lessons learned
Usability	<ul style="list-style-type: none"> • Crashing systems (e.g., causes lost progress) • Lack of interoperability between joint/Service systems • Slow downloads and partial downloads prevent completion

they are available anytime and anywhere, which can help reduce the number of “untrained” staff and serve as ongoing refresher training thereafter. Online courses can include elements of both training and education, as well as content specifically geared to address joint mindsets. E-learning can be readily tailored to a variety of training objectives, in order to better prepare personnel for designated collective events. Individual performance scores can also be recorded and aggregated to give commanders constructive insights into their personnel’s readiness (see Table 1.1 for a summary). In the academic literature, these sorts of obvious advantages are well documented.

Research also demonstrates that well-designed online courses enhance learning outcomes. For instance, according to a recent meta-analysis by the Department of Education, in a review of 50 studies, both adult and child learners performed modestly better in online environments as compared to traditional face-to-face classroom settings (Cohen’s $d = +0.20$ in favor of online learning). The same review found that courses involving blended online and face-to-face instruction performed even

better (Cohen’s $d = +0.35$ in favor of blended learning versus face-to-face classes).¹¹

Military e-Learning Challenges

Only *effective* e-learning can significantly enhance collective training. However, in many cases, military online courses lack engagement, are not sufficiently efficient, or seem to lack relevancy. Online courses are often stovepiped, without clear linkages to other training and education events. The outcome scores provided by the courseware do not generally give commanders or military instructors actionable insights into personnel’s actual skills. In other words, despite the *potential* benefits of well-designed e-learning, online courses in practice often suffer from a range of limitations that negatively impact their effectiveness, utility, and appeal.

To initially identify potential challenges in military online learning, we conducted structured interviews with seven active duty and government

¹¹ U.S. Department of Education, Office of Planning, Evaluation, and Policy Development (2010). *Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies*. Washington, D.C.

civilian stakeholders associated with the major military e-learning enterprises in the Air Force, Army, Navy, Marine Corps, and Joint Staff. These (anonymized) subject-matter experts offered informed opinions about military online courses, and they described specific issues that frequently affect military online learning. These are summarized in Table 1.2.

Overall, respondents identified issues related to the depth and specificity of online content, as well as the associated assessments. Respondents also indicated that many students lack motivation to complete online courses for a variety of reasons; similarly, they reported that some students believe that the courses lack real-world relevance. Finally, all respondents highlighted various usability issues that frustrate and discourage e-learning students. (It is important to note that this feedback reflects general issues with military e-learning; it does not specifically target JKO or any other learning management system, in particular.)

e-Learning Best Practices

In order to shape our plans for mitigating the practical limitations uncovered in the interviews, we compiled relevant best practices from the academic literature. We call these “practical” limitations because the technology and academic knowledge to fix these problems is readily available; yet, the issues persist mainly due to logistical limitations (e.g., budgets) or process problems (e.g., lack of communication protocols).

We began this analysis with a review of general educational best practices, since many elements of good instruction (e.g., the importance of feedback and utility of formative assessments) apply across all media. Then, building on the groundwork of these general recommendations, we conducted a more specific review of best practices for online learning (also known as e-learning or web-based instruction¹²) and blended learning (also known as hybrid learning). Results of the review have been

Table 1.3. Summary of recommendations identified from the academic literature; this high-level review is not intended to describe all e-learning best practices.

Enhance Learning Content

- Clarify expected performance at the beginning
- Vary content delivery styles
- Implement active learning techniques
- Emphasize higher-order thinking

Enhance Online Assessments

- Incorporate valid, reliable, and diagnostic assessments
- Use formative assessments to enhance learning outcomes
- Provide frequent, prompt, and constructive feedback

Enhance Motivation

- Encourage self-regulation
- Employ a mastery-learning approach
- When instructionally appropriate, use multimedia
- Humanize the technology

Enhance Relevance

- Tailor courses to students’ characteristics and learning needs
- Relate instruction to the “big picture”
- Use blended learning

Enhance Usability

- Implement an easy-to-navigate, consistent course structure
- Limit technological glitches
- Provide technical support

summarized below. For this discussion, we have grouped these recommendations based upon the categories identified during the stakeholder interviews (although some of the recommendations support several of these goals). See Table 1.3 for an outline of the literature-based recommendations.

I. Enhance Learning Content

Clarify expected performance at the beginning. Students will perform better in any educational setting if they have a clear understanding of course organization, goals, and expectations. In online environments, research suggests that learners are less distracted¹³ and achieve higher learning outcomes¹⁴ when online courses have clear expecta-

¹³ Dykman, C. A., & Davis, C. K. (2008). Online education forum: Part two—teaching online versus teaching conventionally. *Journal of Information Systems Education*, 19(2), 157-164.

¹⁴ Zsohar, H., & Smith, J. A. (2008). Transition from the classroom to the web: Successful strategies for teaching online. *Nursing*

¹² In this report, the terms *e-learning*, *online learning*, and *web-based learning* are used interchangeably.

tions and guidelines. To facilitate this, introductory course material should clearly establish standards for performance and help students understand the goals of the course and sequence of learning events. In addition to clearly stating this information at the beginning of a course, expectations should be frequently reinforced throughout it,¹⁵ and activities and assessments should concretely link to, and continuously reinforce, these established guidelines and objectives.

Vary content delivery styles. The academic literature¹⁶ frequently suggests that courses, regardless of medium, incorporate *variety*, such as various instructional interventions, in order to increase student engagement and enhance learning outcomes. When courses fall into predictable, redundant delivery modes, students quickly become disengaged and soon begin looking for shortcuts so that they can quickly skip from one predictable task to the next. Varying delivery styles helps hold students' attention and prevent them from adopting a task-focused ("just get it done") orientation.

Implement active learning techniques. As noted by Chickering and Ehrmann,¹⁷ "learning is not a spectator sport." Learners must be able to discuss, write about, and reflect upon the material they are studying. In other words, effective curricula encourage students to take an active role in their learning processes, and the instructional tactics that facilitate this are called active learning techniques.¹⁸

Education Perspectives, 29(1), 23-28.

15 Swan, K. (2003). Learning effectiveness: What the research tells us. In J. Bourne & J. C. Moore (Eds.), *Elements of Quality Online Education, Practice and Direction* (pp. 13-45). Needham, MA: Sloan Center for Online Education.

16 For instance, see the following: Doyle, N. W. (2010). *Accommodating graduate student learning styles in post-professional online occupational therapy courses*. (Unpublished doctoral dissertation). Boston University, Boston, MA. • Gaytan, J., & McEwen, B. C. (2007). Effective online instructional and assessment strategies. *American Journal of Distance Education*, 21, 117-132. • Rinaldi, C., & Gurung, R. (2008). Should teaching and learning styles match? *Teaching Forum*, October 26, 2008 Edition.

17 Chickering, A., & Ehrmann, S. C. (1996). Implementing the seven principles: Technology as lever. *AAHE Bulletin*, 49(2), 2-4.

18 Hess, G. (1999). Principle 3: Good practice encourages active

In contrast to active learning, passive learning techniques generally involve didactic methods that may facilitate factual recall but fail to promote deeper understanding. Passive learning approaches are unlikely to move students beyond basic comprehension to higher-order thought, and although learning declarative and procedural information is important, low-level comprehension only partially supports most learning goals. Therefore, active learning techniques help learners both acquire and extend their lower-level knowledge so that they begin to understand whole concepts rather than simply rote definitions and routines.¹⁹

Emphasize higher-order thinking. Learners should be encouraged to think critically about a topic and to create a meaningful representation of it in their own minds. In other words, students should be encouraged to engage in higher-level thinking, such as critical analysis and reflective judgment.²⁰ While active learning techniques often encourage such cognitive processes, other instructional design features also promote it. For example, scaffolding principles that help students complete material that is slightly too difficult encourages a "cognitive stretch," which helps students gradually build their reasoning skills as well as competence with the subject matter.²¹

Similarly, various e-learning delivery mechanisms can bolster (or inhibit) learners' higher-level thinking. For example, using interactive learning activities and effectively incorporating multimedia can encourage students to reach for a higher

learning. *Journal of Legal Education*, 49(3), p. 401.

19 Chickering & Ehrmann, Implementing the seven principles: Technology as lever.

20 Higher-order thinking emphasizes those cognitive, affective, and psychosocial skills that involve more sophisticated mental processes, such as analysis, synthesis, evaluation, and metacognition. See Bloom, B. S. (1956). *Taxonomy of educational objectives: Handbook I: Cognitive domain*. New York: David McKay Company, Inc.; and see Krathwohl, D.R. (2002). A Revision of Bloom's Taxonomy: An Overview. *Theory into Practice*, 41(4), 212-218.

21 Fox, M., & Helford, P. (1999). Advancing the boundaries of higher education in Arizona using the World Wide Web. *Interactive Learning Environments*, 7(2-3), 155-174.

level of performance,²² and simply ensuring that the content is clear and well-organized can have a profound impact.²³

2. Enhance Online Assessments

Incorporate valid, reliable, and diagnostic assessments. Monitoring, diagnosing, and intervening (if necessary) to ensure all students remain on-track requires the frequent use of formal and informal assessment. Of course, assessments cannot merely be plentiful; they must also be effective, which means they must be reliable, valid, and diagnostic.

Reliable assessments are internally consistent; they function equally for all students and for the same student at different points in time. *Valid* assessments accurately target the knowledge, skills, and attitudes that they are intended to measure, and *diagnostic* assessments provide specific, meaningful insights about students' capabilities.

Use formative assessments to enhance learning outcomes. A common practice in education and training is to provide "checks on learning," both during and immediately following instruction. More formally, these checkpoints are called formative and summative assessments, respectively. Formative assessments, which are administered during the learning process, gauge students' progress, indicate whether teaching and learning activities need to be modified, and help improve learner achievement. These assessments are typically less formal than summative tests because the primary goal of formative assessments is to enhance learning rather than to grade students. In fact, the actual scores earned on formative assessments need not be officially recorded, since performance on formative tests is used to provide feedback rather than track student outcomes.

Students who complete formative assessments

during a course learn to recognize and correct their errors, and they build deeper knowledge and stronger skills.²⁴ The key to achieving these benefits is providing effective feedback. When used appropriately, inclusion of formative assessments and associated feedback can improve students' learning outcomes by 20–40 percentile points.²⁵

Provide specific, timely, and actionable feedback. Online learning should incorporate frequent, clear, and constructive feedback that is prompt, relevant, and actionable. Good quality feedback is also reflective; it helps students troubleshoot their performance shortcomings and self-correct.²⁶ Effective, continuous feedback correlates highly with student satisfaction²⁷ and learning outcomes,²⁸ and individualized feedback can enhance students' comfort levels in an online environment, leading to significant gains in learning achievement.²⁹

When feasible, instructor feedback is particu-

24 Crooks, T.J. (1988). The impact of classroom evaluation practices on students, *Review of Educational Research*, 58, pp. 438–481.

25 Ainsworth, L. & Viegut, D. (2006). *Common formative assessments: How to connect standards-based instruction and assessment*. Thousand Oaks, CA: Corwin Press.

26 Nicol, D., & MacFarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education*, 31(2), 199–218.

27 Darrington, A. (2008). Six lessons in e-learning: Strategies and support for teachers new to online environments. *Teaching English in the Two Year College*, 35(4), 416–421. • Zsohar, H., & Smith, J. A. (2008). Transition from the classroom to the web: Successful strategies for teaching online. *Nursing Education Perspectives*, 29(1), 23–28.

28 Research consistently demonstrates that consistent and informative feedback is beneficial to learners, for instance, see Swan, K. (2003). Learning effectiveness: What the research tells us. In J. Bourne & J. C. Moore (Eds.), *Elements of Quality Online Education, Practice and Direction* (pp. 13–45). Needham, MA: Sloan Center for Online Education. • Chickering, A., & Gamson, Z. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin*, 40, 3–7. • Chickering & Ehrmann, Implementing the seven principles: Technology as lever. • Janicki, T., & Liegle, J. O. (2001). Development and evaluation of a framework for creating web-based learning modules: A pedagogical and systems approach. *Journal of Asynchronous Learning Networks*, 5(1), 58–84.

29 Gallien, T., & Oomen-Early, J. (2008). Personalized versus collective instructor feedback in the online classroom: Does type of feedback affect student satisfaction, academic performance and perceived connectedness with the instructor? *International Journal on ELearning*, 7(3), 463–476. • Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education*, 5(1), 7–74.

larly valuable in an online course. However, when an instructor is not available to offer guidance, learners must rely on feedback from the learning management system. In these cases, feedback is generally provided in response to assessments, which reinforces the need to integrate evaluations frequently throughout a course.³⁰

3. Enhance Motivation

Encourage self-regulation. Online learning works best for independent, highly motivated learners with time management, literary, and technological skills (i.e., the characteristics of adult learners).³¹ To help students succeed in this context, curricula should promote student self-regulation.

Self-regulation requires students to take control of their own learning by monitoring their progress and comparing it against established learning standards.³² Research has shown that it is possible to foster self-regulation in students by carefully structuring the learning environment and encouraging the use of metacognition, self-monitoring, and self-regulatory practices.³³ The research also notes that self-assessments and formative assessments can promote these reflective processes. Self-

assessments give learners the opportunity to reflect on their performance, which enhances learning outcomes, and helping learners engage in realistic self-assessment has revealed a marked improvement in student's performance on summative exams.³⁴

Employ a mastery-learning approach. In mastery learning, performance standards remain constant and the amount of time different students require to reach mastery is allowed to vary. This approach differs from common instructional models in which all learners are given the same amount of time and, often, the same instructional interventions, but their achievement levels are allowed to vary.³⁵ In other words, the mastery-learning approach encourages learners to master the material, not just "pass" the module.³⁶ When given enough time and appropriate instruction, 90–95% of students can achieve mastery.³⁷

Online courses readily support mastery learning because they allow students to receive individualized content, experience different instructional interventions, and complete modules at their own pace.³⁸ However, to encourage students to adopt a mastery learning approach—rather than simply focus on course completion—e-learning curricula must actively refocus students on mastery-learning

30 Twigg, C. A. (2001). *Innovations in online learning: Moving beyond no significant difference*. The Pew Symposia in Learning and Technology 2001. Center for Academic Transformation at Rensselaer Polytechnic Institute, Troy, NY.

31 Barbour, M. K. & Reeves, T. C. (2009). The reality of virtual schools: A review of the literature. *Computers & Education* 52, 409-416.

32 Nicol, D., & MacFarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education*, 31(2), 199-218. Also, a more direct definition of self-regulation is given by Pintrich and Zuschko: "Self-regulated learning is an active constructive process whereby learners set goals for their learning and monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and the contextual features of the environment." See Pintrich, P. R., & Zuschko, A. (2002). The development of academic self-regulation: The role of cognitive and motivational factors. In A. Wigfield & J. Eccles (Eds.), *Development of Achievement Motivation* (pp. 250-271). NY: Academic Press.

33 Schunk, D. H., & Zimmerman, B. J. (Eds.). (1994). *Self-regulation of learning and performance: Issues and educational applications*. Hillsdale, NJ: Erlbaum. • Pintrich, P. R. (1995). Understanding self-regulated learning. *New Directions for Teaching and Learning*, 63, 3-12. doi: 10.1002/tl.37219956304

34 McDonald, B., & Boud, D. (2003). The impact of self-assessment on achievement: The effects of self-assessment training on performance in external examinations. *Assessment in Education*, 10(2), 209-220.

35 Block, J. H., & Burns, R. B. (1976). *Mastery learning*. *Review of Research in Education*, 4, 3-49. • Anderson, L. W. (2000). Why should reduced class size lead to increased student achievement? In M. C. Wang & J. D. Finn (Eds.), *How small classes help teachers do their best* (pp. 3-24). Philadelphia: Temple University Center for Research in Human Development.

36 Chickering & Gamson, 3-7, and Chickering & Ehrmann, 2-4.

37 Ericsson, K. A. (in press). Adaptive expertise & cognitive readiness: A perspective from the expert-performance approach. In H. F. O'Neil, R. S. Perez, & E. L. Baker (Eds.), *Teaching and measuring cognitive readiness*. Houten, the Netherlands: Springer. * Bloom, B. S. (1968). Learning for mastery. *Evaluation Comment*, 1(2), 112.

38 Using mastery learning approaches in e-learning was discussed in a literature review; see Swan, K. (2004). Learning online: Current research on issues of interface, teaching presence and learner characteristics. In J. Bourne & J. C. Moore (Eds.), *Elements of Quality Online Education, Into the Mainstream* (pp. 63-79). Needham, MA: Sloan Center for Online Education.

goals throughout the course.

When students focus on mastery learning they show higher levels of engagement and improved learning outcomes. Alternatively, when students adopt task-focused attitudes (i.e., a desire to “just get it done”) they are less motivated to learn.³⁹ In addition to enhancing motivation, mastery learning leads to higher achievement levels, and at the end of each learning module, mastery learning ensures that students have acquired the prerequisite knowledge and skills to continue through the course.⁴⁰

When instructionally appropriate, use multimedia. As consumers of online learning, most people already realize that “not all online courses provide high quality learning experiences, as many consist of little more than books behind glass with little or no interaction.”⁴¹ In other words, like poorly designed face-to-face classes, many e-learning courses simply use one-way, “transmissive” rather than ‘interactive’ learning strategies.”⁴² This contributes to lower levels of engagement and can inhibit the learning process. Interactive multimedia, however, can help convey information in more engaging, more communicative ways.⁴³ For example, researchers found that when video modes were used in lessons, learners achieved higher learning outcomes and had increased retention.⁴⁴

39 The need to balance the complementary goals of course completion and content mastery was noted by Davies in 2003. In a study of students enrolled in an online undergraduate course, Davies found that learners initially intended to learn the material in a mastery approach, but later (as due dates approached), switched their intent primarily to course completion. See Davies, R. S. (2003). Learner intent and online courses. *The Journal of Interactive Online Learning*, 2(1), 1-10.

40 Anderson, 3-24.

41 Nagel, L., & Kotzé, T.G. (2009). Supersizing e-learning: What a CoI survey reveals about teaching presence in a large online class. *Internet and Higher Education*, p. 1

42 Waddoups, G., & Howell, S. (2002). Bringing online learning to campus: The hybridization of teaching and learning at BYU. *International Review of Research in Open and Distance Learning*, 2(2).

43 see Richard Mayer’s Multimedia Theory for guidelines of how to appropriately present different media; for instance, see Mayer, R. (2001). *Multimedia Learning*. Cambridge: U. of Cambridge.

44 Dieker, L., Lane, H., Allsopp, D., O’Brien, C., Butler, T., Kyger, M., Lovin, L., & Fenty, N. (2009). Evaluating video models of evidence-based instructional practices to enhance teacher learning.

Humanize the technology. One strength of traditional face-to-face courses is that they facilitate important social interactions with peers and instructors. These relationships encourage student self-assessment, increase their self-efficacy⁴⁵ and satisfaction,⁴⁶ and enhance learning outcomes.⁴⁷ In online environments, collaboration tools such as blogs, wikis, podcasts, vodcasts, and virtual worlds can effectively support such interactions.

Many e-learning courses, however, are entirely asynchronous, and learners never have the opportunity to interact with instructors or fellow students.⁴⁸ Some students are not ready for this type of independent online learning,⁴⁹ and they may feel isolated or detached.⁵⁰ In these cases, strategies that help “humanize” the technology can help. For instance, the use of a personalized welcome note or video from an instructor, or simply the inclusion of humor in a course, can make students feel more

Teacher Education and Special Education, 2, 180-196.

45 For example, see Castle, S., & McGuire, C. (2010). An analysis of student self-assessment of online, blended, and face-to-face learning environments: Implications for sustainable education delivery. *International Education Studies*, 3(3), 36-40. • 37 Lizano-Di-Mare, M. (2009). *Best practices for online instructional communication*. *Journal of Instruction Delivery Systems*, 23(3), 17-22.

46 For example, see Appana, S. (2008). A review of benefits and limitations of online learning in the context of the student, the instructor, and the tenured faculty. *International Journal on ELearning*, 7(1), 5-22. • 38 Gallien, T., & Oomen-Early, J. (2008). Personalized versus collective instructor feedback in the online classroom: Does type of feedback affect student satisfaction, academic performance and perceived connectedness with the instructor? *International Journal on ELearning*, 7(3), 463-476.

47 For example, see Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. Washington, DC: U.S. Department of Education. • Swan, K., & Shih, L. F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous Learning Networks*, 9(3), 115-136. • Gaytan, J., & McEwen, B. C. (2007). Effective online instructional and assessment strategies. *American Journal of Distance Education*, 21, 117-132. • Stein, Wanstreet, Calvin, Overtoom, & Wheaton, pp. 105-118..

48 Welsh, Wanberg, Brown, & Simmering, pp. 245-258.

49 Graham, C. R., Allen, S., & Ure, D. (2005). Benefits and challenges of blended learning environments. *Encyclopedia of information science and technology*, 1, 253-259.

50 Rovai, A. P. & Wighting, M. J. (2005). Feelings of alienation and community among higher education students in a virtual classroom. *Internet and Higher Education*, 8(2), 97-110.

connected.⁵¹

4. Enhance Relevance

Tailor courses to students' characteristics and learning needs. In his classic study, Bloom found that students who received one-on-one tutoring performed two standard deviations superior to students who were taught via the conventional group method.⁵² The average tutored student performed better than 98% of the control class. This study, and others like it, demonstrate that human tutors tailor their instruction to their students and impressive learning gains often result from that interaction.

The best online learning environments provide an individualized experience for each learner that leads to topic mastery. In instructor-led settings, teachers can monitor students' individual difference and learning progress and then adjust instructional interventions, as needed. In learning environments without instructors, adaptive software can substitute for some of these instructor activities.

Adaptive instructional technologies are computer-based tools that attempt to individually tailor instruction by diagnosing students' needs and then modifying content and delivery mechanisms to best support them. In other words, computer-based adaptive instructional systems "attempt to be different for different students and groups of students by taking into account information accumulated in the individual or group student models."⁵³

Online adaptive instructional technology, or "adaptive hypermedia," usually personalizes course content based upon students' demographics and test performance. These adaptations can include modifications to the material or delivery mechanisms. For instance, a senior leader might automatically receive a more in-depth version of a course's

content, or, based upon poor assessment results, a young lieutenant might be asked to complete a remedial multimedia activity.

Relate instruction to the "big picture." Frequently, students are skeptical of the significance of a course; however, all valid instruction has value beyond the classroom or web-portal. To make a lesson's relevance more explicit, curricula should include a bridge to connect learning events to student goals and real-world applications. Many studies show that when students understand the relevance of a course, they exhibit increased engagement⁵⁴ and greater motivation to learn.⁵⁵

Instructional design that links new concepts to students' goals, experiences, and knowledge also improves recall; these connections help students "...make what they learn part of themselves."⁵⁶ To achieve this, instructors and/or course content should reinforce and review previously learned material and explain how new concepts relate to prior content. Course activities should also help students connect what they learn today with future learning; for instance, scenarios and narratives can help demonstrate how knowledge might be applied in new situations. Asking students to self-reflect about the ways the course prepares them for real-life can also help them recognize its utility.⁵⁷

Use blended learning. Blended learning environments (also known as hybrid learning environments) include both face-to-face instruction and computer-mediated learning.⁵⁸ They combine the individualized support and engagement of regular

⁵⁴ Shernoff, D. J., Csikszentmihalyi, M., Schneider, B., & Shernoff, E. S. (2003). Student engagement in high school classrooms from the perspective of flow theory. *School Psychology Quarterly, 18*(2), pp. 158-176.

⁵⁵ For example, see Frymier, A. B. & Shulman, G. M. (2009). "What's in it for me?": Increasing content relevance to enhance students' motivation. *Communication Education 44*(1), pp. 40-50.

⁵⁶ Chickering & Erhmann, 2-4.

⁵⁷ Teaching as Leadership. (2009). Retrieved www.teachingas-leadership.org.

⁵⁸ Graham, C. R., Allen, S., & Ure, D. (2005). Benefits and challenges of blended learning environments. *Encyclopedia of information science and technology, 1*, 253-259.

⁵¹ Anderson, D. G. (2011). Taking the "distance" out of distance education: a humorous approach to online learning. *MERLOT Journal of Online Learning and Teaching, 7*(1), http://jolt.merlot.org/vol7no1/anderson_0311.htm

⁵² Bloom, 3-16.

⁵³ Brusilovsky, P. & Peylo, C. (2003) Adaptive and intelligent Web-based educational systems. *International J. of Artificial Int. in Ed., 13*(2-4), 159-172.

face-to-face meetings with the flexibility and availability of online instructional activities.

Blended environments produce better learning outcomes than either face-to-face or web-based learning alone. This was documented in the Department of Education's recent meta-analysis, which found that blended environments performed substantially better than traditional face-to-face courses (Cohen's $d = +0.35$ in favor of blended learning) and modestly better than solely online courses (Cohen's $d = +0.05$ in favor of blended learning).⁵⁹

Blended learning has many forms. From course to course, the proportion and timing of online versus face-to-face instruction varies, and the electronic options may include anything from independently accessed, remote e-learning tools to collaborative virtual environments.⁶⁰ The effectiveness of blended learning does not depend upon a one-size-fits-all model; "...creating a blended program is not dependent on technology. Rather it is a process of problem identification, defining the blended model, and carefully managing and measuring program execution."⁶¹ In other words, success in blended learning depends upon tailoring the available features, from both classroom and website, to best meet instructional goals and students' needs.

5. Enhance Usability

Implement an easy-to-navigate, consistent course structure. Research findings show that the organization of web-based courses substantially affects their learning outcomes. If the students find a learning management system confusing or difficult to use, their learning outcomes and retention rates will decline.⁶²

Course content modules should clearly inform

59 Department of Education, p. 38.

60 Rossett, A. & Sheldon, K. (2001). *Beyond the podium: delivering training and performance to a digital world*. San Francisco: Jossey-Bass/Pfeiffer, p. 281.

61 Bersin, J. (2004). *The blended learning book: best practices, proven methodologies, and lessons learned*, San Francisco: Wiley & Sons. p. 5

62 Kruse, K. (2002), *The benefits and drawbacks of e-learning*. <http://e-learningguru.com>

learners of the content, sequencing, and performance expectations, and courses should implement a consistent and easily navigable interface.⁶³ Other support features, such as help menus, can also enhance the perceived usability of online courses.⁶⁴ "Course design and presentation mechanisms—together with excellence in online dialogue facilitation—separate the excellent online course from the mediocre or weak one."⁶⁵

Limit technological glitches. Technical difficulties, such as error messages or degraded media, frequently disrupt e-learning courses. Unsurprisingly, these technological distractions have been shown to increase learner frustration, decrease learner satisfaction, and increase attrition rates. The interruptions caused by technical problems can also make it more difficult for students to focus on the instructional material, and these distractions may negatively impact students' cognitive workload.⁶⁶ Thus, to the extent possible, it is important to limit the number of technical issues.

Provide technical support. Access to technological support can limit the disruptiveness of technological glitches. To facilitate improved learning outcomes and increase student satisfaction, courses should make technological support easily accessible.⁶⁷ In addition to providing contact information for a help desk, integrated tutorials and organizational site maps can also support troubleshooting.

63 "Findings indicated that clarity of design, interaction with instructors, and active discussion among course participants significantly influenced students' satisfaction and perceived learning," see Swan, p. 306.

64 Janicki, T., & Liegle, J. O. (2001). Development and evaluation of a framework for creating web-based learning modules: A pedagogical and systems approach. *Journal of Asynchronous Learning Networks*, 5(1), 58-84.

65 Collison, Elbaum, Haavind, & Tinker, p. 1

66 Sitzmann, T., Ely, K., Bell, B. S. & Bauer, K. N. (2010). The effects of technical difficulties on learning and attrition during online training. Retrieved 5 Nov 2011, from Cornell University, ILR School site: <http://digitalcommons.ilr.cornell.edu/articles/40>

67 Heale, R., Gorham, R., & Fournier, J. (2010). An evaluation of nurse practitioner student experiences with online education. *Journal of Distance Education*, 24(3), 33-46.

ing.⁶⁸ If students are unable to effectively use course functions, cannot access the learning content, and feel neglected, they are more likely to drop out of a course.⁶⁹

Chapter Summary

This chapter provided an overview of issues associated with joint collective training. Joint Training seeks to resolve these issues by leveraging web-based (and blended) learning approaches. However, to do this effectively, several practical limitations associated with military e-learning must first be resolved.

We conducted a front-end analysis, including

stakeholder knowledge elicitation and a review of published best practices, in order to identify the practical gaps and corresponding resolution strategies needed to enhance military online learning. From these efforts, as well as ongoing testing and iterative refinement, the team developed the Continuum of eLearning framework.

The CoL is designed to overcome the five collective training challenges described in this chapter, while also enhancing military e-learning. The CoL represents both a capability (i.e., the course content) and a methodology (i.e., the implementation approach) for bolstering joint training and education. The specific design of the CoL is described in more detail in Chapter 2, and Chapter 3 describes a large-scale beta test of its effectiveness.

68 Chou, C. (2003). Interactivity and interactive functions in web-based learning systems: A technical framework for designers. *British Journal of Educational Technology*, 34(3), 265-279.

69 Rovai, A. P. & Wighting, M. J. (2005). Feelings of alienation and community among higher education students in a virtual classroom. *Internet and Higher Education*, 8(2), 97-110.



CoL DESIGN AND VISION

This section outlines the envisioned capabilities of the CoL components as well as their corresponding design, development, and implementation methodology. These specifications were derived from published best practices (see Chapter 1) as well as from empirical testing and stakeholder knowledge elicitation (see Chapter 3). Through ongoing testing, the ultimate design of the CoL may evolve beyond what this chapter describes; however, as of its writing, this section provides the most current vision for the CoL. Future developments will be described in supplemental chapters.

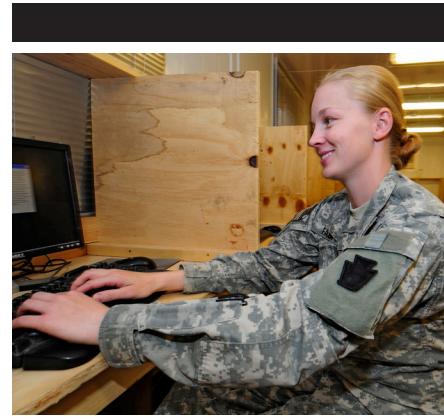
CoL Components

The CoL represents both a methodology for blending individual and collective training, as well as the web-based training tools to support the blended learning. Together, these processes and technologies are intended to boost personnel's knowledge of joint mission-relevant topics before, during, and after an exercise or deployment.

As its name implies, the CoL represents a continuum of training events, which are intentionally blended together in order to mutually reinforce one another. The first stage in the CoL consists of individual, self-paced courses administered by the JKO learning content management system (LCMS). The second stage involves small-group part-task training, which is also delivered through the online system. Traditional live training, including face-to-face academics and collective exercises, is then integrated into the third stage of the continuum. See Figure 2.1 for a high-level depiction. Each of these components is described in more detail below.

Individual Online Courses

The first component of the CoL involves self-paced e-learning delivered through JKO (see Figure 2.2). These online courses are di-



Sgt. Tova Faust, a CH-47 Chinook helicopter mechanic, logs onto a computer at Camp Adder, Iraq (www.dvidshub.net)

SECTION SUMMARY

The CoL is both a methodology for designing, developing, and implementing blended learning, as well as the technological capabilities to support it. The technological backbone of the CoL resides on Joint Knowledge Online.

The CoL's continuum of learning includes self-paced online courses, a part-task online team simulation, and the existing live training events, enhanced with blended learning approaches.

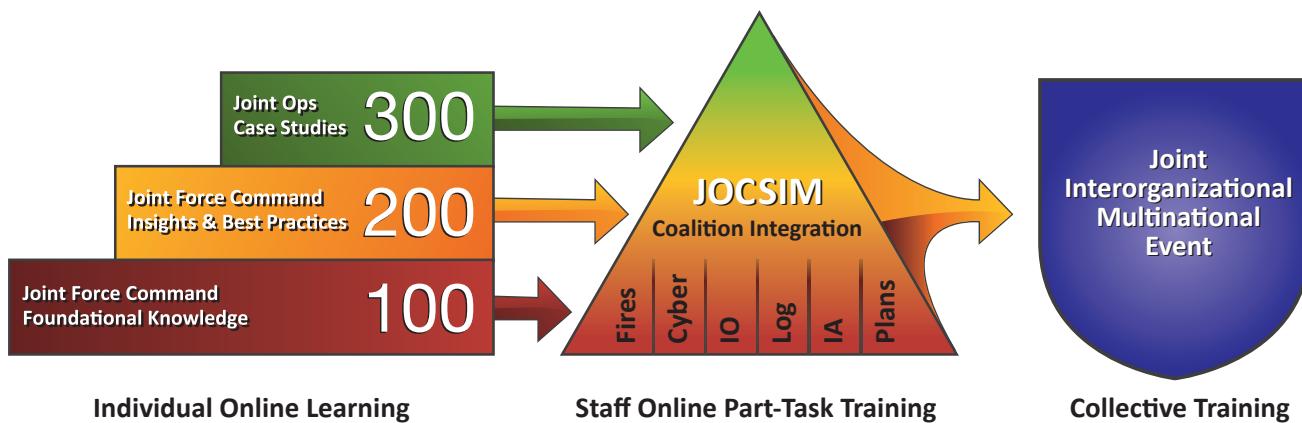


Figure 2.1. High-level depiction of the structure of the CoL continuum, which spans from individual learning to collective training

vided into three tiers of instruction, which advance from level 100 to 300. The 100-level lessons are based on joint doctrine and contain joint force command foundational knowledge, including the standard Joint Force Command (JFC) training package. The 200-level lessons build upon the doctrine presented in the 100-level courses. They contain experts' operational insights from published best-practices focus papers. Finally, the 300-level courses highlight case studies **are** drawn from the Joint Center Operational Analysis – Lessons Learned.

Staff Online Part-Task Training

The second stage of the CoL involves online part-task training designed for use by small groups of staff members (roughly 5–40 people). This part of the CoL simulates staff activities in a Joint Operations Center (JOC) and, consequently, is called the JOC Simulation or JOCSIM. The JOCSIM also resides on JKO, and staff members use it to synchronously complete training scenarios, either in collocated or distributed settings (see Figure 2.3). The JOCSIM is an expansion of the Small Group Scenario Training (SGST), which CCMDs already use to facilitate joint training.

Blended Learning and Training

The third stage of the CoL incorporates existing live training, including large-scale collective exercises as well as various supporting activities, such as classroom-based academics and small-scale pre-training practice exercises (see Figure 2.4). The nature of these activities remains largely unchanged in the CoL, except that the live lessons are blended with the online components. Blending allows the live training to more explicitly link to and build from the learning interventions of the first two stages of the CoL.



Figure 2.2. Screen capture from an individual online course (CoL demo content)



Figure 2.3. Screen capture of an SGST training scenario (Courtesy of JKO)



Figure 2.4. PANAMAX 2011 exercise at US Army South (www.dvidshub.net)

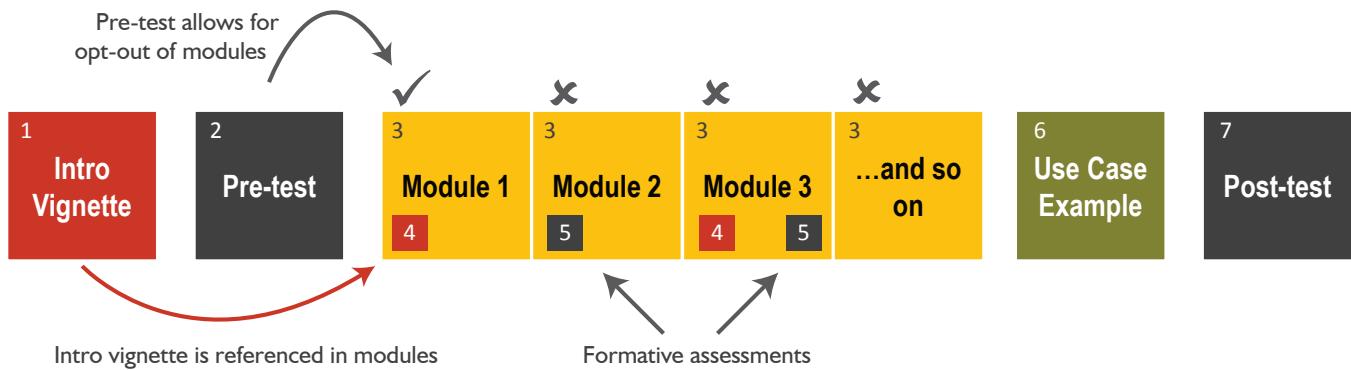


Figure 2.5. General structure of a CoL individual, self-paced course; the numbers correspond to the subsections in the discussion below.

Concept of Operations

The sections below describe the concept of operations (CONOPS) for the CoL online courses and JOC simulation scenarios, as well as the CoL mechanisms for facilitating blended learning. Although each course or scenario may include varying instructional content and delivery tactics, they should all generally adhere to the high-level structure and blended learning techniques discussed below.

Individual Online Learning

The online courses, which represent the first component of the CoL, are designed to be individual, self-paced instructional packages that students can complete without the aid of peers or an instructor. Each CoL online course generally follows this structure (see Figure 2.5):

1. Opening Vignette
2. Pre-Test
3. Content Modules
4. Framing within Modules
5. Formative Assessments within Modules
6. Use-Case Example
7. Post-Test

1. Opening vignette. Each CoL course begins with an engaging multimedia story that describes a historic event related to the course content. For instance, a module about joint planning may begin by describing an actual incident where mission effectiveness suffered due to poor operational plan-

ning. These historic vignettes serve several purposes. First, they grab learners' attention, which is a standard principle of good instructional design. Similarly, they help show the real-world relevance of courses, and they better contextualize course content. These features, in turn, enhance students' motivation, course relevance ratings, and learning outcomes.

2. Pre-test. Following the opening vignette, students complete a pre-test. Each item on the pre-test corresponds to a Terminal Learning Objective (TLO) within the course. To limit test-retest effects and answer sharing, several versions of question are available per TLO, and the online JKO learning management system randomly selects one of these variants for the pre-test and the post-test.

An average CoL course will have 2–10 TLOs, each of which may be associated with 1–10 Enabling Learning Objectives (ELOs). Pre-tests include at least one item for each TLO; however, since most TLOs feature multiple ELOs and each ELO aligns with at least one question, each TLO will likely be represented by four or five items on pre- and post-tests.

On the pre-test, a successful response to a given item suggests that the student already possess the knowledge associated with that TLO, and therefore, the system will “opt-out” of those modules in the course. Scores from pre-tests are only used to inform their associated online and blended courses, and they do not adversely affect students' permanent records.

3. Content modules. Student who fail to pass all or some of a pre-test must complete the content modules associated with each failed learning objective. The modules present their associated content using e-learning best practices that enhance learning experiences, such as active learning techniques and interactive multimedia, as well as techniques that enhance learning outcomes, such as fostering higher-order thinking, self-reflection, and mastery-learning attitudes.

As briefly mentioned above, the content modules “align” to joint force command publications and training requirements. Content from the 100-level individual online courses, for instance, is doctrinally focused, and it explicitly links to the Universal Joint Task List (UJTL). Similarly, content in the 200- and 300-level courses aligns with publications on best practices and operational lessons learned.

4. Framing within modules. As appropriate, modules include mechanisms that help contextualize the facts and procedures being learned. In other words, the modules are designed to include content associations, short narratives, interactive multimedia, or other instructional devices that help frame the instructional material, relate it to real-world operations, and explain how it ties to the opening historic vignette.

5. Formative assessments within modules. As appropriate, modules include formative assessments to evaluate students’ progress and encourage their self-reflection. The formative assessments are specifically designed to target higher-order thinking, such as appreciating how different concepts fit together.

Similar to the pre-tests, the actual scores associated with formative assessments help inform the learning process, and they do not adversely affect students’ permanent records. However, these data provide opportunities for the learning management system to provide feedback. As feasible, the system should provide detailed responses to each students’ unique performance.

6. Use-case example. After students complete all of the required modules, they will review a real

or fictional scenario that shows how the material presented in the course could be applied in a practical use-case. Where the historic vignette at the beginning of a course is intended to gain students’ attention and increase their motivation to learn, the use-cases at the end of a course are intended to facilitate students’ transfer of training by helping them learn how to transform their new knowledge into operational practice. When appropriate, the narrative elements within the use-case example are intended to link to the associated small-group training scenario (described in the next section of the report).¹

7. Post-test. Finally, students complete a post-test, which includes the same general content as the pre-test (although the specific questions may differ). As part of a mastery-learning approach, students are required to achieve high levels of performance on the post-test; they must score at or near 100% correct. If students miss a question, they receive feedback and have the opportunity to review the associated module(s). Students must re-take the portions of the post-test that they do not initially pass (with different questions per topic), and students receive certification of course completion only after completely passing this summative examination.

Staff Online Part-Task Training

The small-group online simulation component of the CoL, or JOCSIM, facilities part-task team training. Scenarios are designed to be completed by 5–40 trainees while being monitored by several OTs. Because the software resides online, the trainees and OTs may or may not be located in the same physical place.

The JOCSIM is an expansion of the Small

¹ Although each CoL course includes only a single use-case scenario, multiple use-cases would ideally be developed for each curriculum. Then different use-cases can be made available to different learners, based upon individual students’ characteristics (e.g., rank or functional area) or a group’s exercise learning objectives. For example, a course on joint planning may be associated with three use-case scenarios: one involving migrant operations, another involving disaster relief, and a third associated with counter-drug operations. Although each use-case would offer a walkthrough of joint operational planning, they would each do so in a different context.

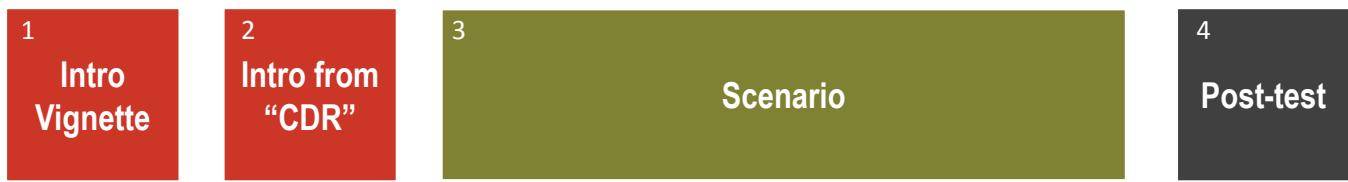


Figure 2.6. General structure of a CoL JOCSIM small-group scenario; the numbers correspond to the subsections below.

Group Scenario Trainer (SGST), an established desktop trainer that simulates operational planning activities. The existing SGST 1.0 capability is more limited than the ultimate vision for the JOCSIM; however, even in its current state, the SGST successfully supports staff training.² Building the SGST into the complete JOCSIM capability is expected to further enhance these benefits.

Each JOCSIM learning experience should generally follow this structure (see Figure 2.6):

1. Opening Vignette
2. Narrative Scenario Introduction
3. Training Scenario
4. Post-Test

Note: Figure 2.6 does not explicitly depict an after-action review component because the OTs are expected to deliver formative feedback and facilitate summative AARs, and their feedback delivery processes are not constrained by the formalized CoL design framework.

1. Opening vignette. Similar to the individual online courses, each JOCSIM episode executed through the SGST begins with a multimedia presentation that reinforces the lessons learned in the corresponding self-paced course. This serves to gain students' attention, reinforce the previously learned material, and prime students' performance for the upcoming training scenario. These opening vignettes do not include narrative-specific information; instead, they emphasize general principles related to the training objectives. This allows reuse; the same opening vignette can support different training scenarios, so long as each scenario includes

the same high-level training goals (e.g., *joint planning* for disaster relief and *joint planning* for counter-drug operations).

2. Narrative scenario introduction. After the opening vignette reinforces the training content, a second multimedia vignette presents narrative information that frames the training scenario. In this vignette, a “commander” presents the content in a format similar to a mission briefing. When feasible, this commander may be a digital version of one of the trainees’ actual senior leaders; in other cases, the multimedia commander may be a fictional character. In either case, the commander presents the “road to crisis” (i.e., the events that preceded the current scenario), as well as his/her expected mission outcomes and general guidance (i.e., the instructional goals and “rules” for the scenario).

3. Training scenario. Once students have watched the introductions, they can begin the training scenario. During the scenario, participants interact with desktop computers similar to the ones on which they would perform their normal staff operations. Each participant has access to realistic planning interfaces and files, and simulated injects (e.g., messages or news stories) introduce new information into the scenario as it unfolds.

4. Post-test. Finally, students individually complete a post-scenario assessment, which includes questions similar to those found on the summative online exam. This post-test not only reinforces the training objectives from the self-paced courses and small-group scenario, but it also helps OTs track personnel’s learning progression over time.

² The Lead Observer-Trainer for Unified Endeavour recently remarked that the “SGST seems to be the gap filler we have been looking for between academics, which is the crawl, to MRX [Mission Rehearsal Exercise], which is the run.”

Blended Learning and Training Processes

The third stage in the CoL learning continuum involves live training. Although the CoL does not directly modify these activities, it provides mechanisms for blending the individual online courses and small-group simulation-based training with the live, collective training activities. As of the writing of this report, the CoL's blended learning approach is being actively designed; consequently, the specifications below will be expanded upon in future publications. To date, however, two processes have been identified to support CoL blended learning and training goals:

1. Blended learning-training packages
2. Access to analyzed outcome data

1. Blended learning-training packages. Blended learning-training packages are curricula focused around a particular training objective that include linked activities for online learning, small-group scenarios, and collective training activities. A critical aspect of these packages is that the components "align" with each other (as well as with foundational knowledge, such as doctrine or published best practices). In practice, this means that the CoL components within a blended package must incorporate the training themes associated with a collective exercise. For instance, an effectively aligned JOCSIM scenario would build from the training objectives specified in a related online CoL course while also integrating tasks from the Mission Essential Task List (METL) from the associated collective training exercise.

2. Access to learning outcomes data. As part of the blending process, OTs and commanders need access to personnel's performance scores from the online components of the CoL. This allows them to better tailor training activities to personnel's knowledge and skill needs.

Enhanced Development Processes

The final two components of the CoL have no technological or material components; they solely involve updated processes. The first set of updated

processes involves enhancements to instructional design and development, including:

1. Revised content design processes
2. Revised training objective ID processes
3. Improved course alignment processes
4. Processes for an OT feedback loop

As with the blended learning and training discussed above, the nature of the enhanced development processes is being actively refined. Future publications will expand upon these specifications.

Enhanced Execution Processes

The last CoL component involves strategies for enhancing the efficiency of CoL blended learning and training execution. Again, these processes are currently under development, but they include items such as streamlining the student log-in processes for accessing exercise-specific online training and providing information to commanders about course completion times along with recommendations for possible on-duty training time allotments.

CoL Version 1.0

Version 1.0 of the CoL was implemented in 2012 through JKO. To date, it includes individual online courses with content from the 100 (i.e., "basic") and 200 (i.e., "intermediate") levels of the joint force command curriculum, which covers topics such as joint fundamentals, joint planning, and interorganizational and multinational coordination. During 2012, CoL developers focused on building and testing the enhanced self-paced courses, as well as designing the conceptual framework and processes for the overall learning continuum. Although it does not yet achieve the full vision for the CoL, Version 1.0 incorporates many of the best practices described in Chapter 1 in order to better support student learning.

Enhanced Learning Content

The CoL V1.0 incorporates some of the content and delivery best practices described in Chapter 1, including the use of scaffolding, multimedia, and

(limited) situated learning. Future versions of the CoL self-paced courses will expand upon these features to better clarify learning expectations from the start, include a greater variety of delivery styles, and offer more opportunities for learners to engage in higher-level cognitive processes. Additionally, as the JOCSIM component is integrated into the CoL, students will be able to participate in active learning.

Enhanced Online Assessments

Formative assessments. The CoL V1.0 incorporates formative assessments into about 25% of its modules (inclusion of more formative assessments was deemed too time-consuming for students). These quizzes are designed to enhance learning by encouraging students to reflect on their knowledge and think about the feedback given after the quizzes. The actual scores associated with the formative assessments are not saved in the learning management system.

Valid and diagnostic assessments. One of the objectives of the CoL is to engender higher-order thinking. To motivate students to engage in deeper thinking during CoL courses, and in order to assess whether they are meeting learning goals, corresponding higher-order measurement approaches must be employed for both the formative and summative assessments.

Many common apparatus, however, only measure lower-level skills. For instance, tests may simply measure recognition (e.g., select the right vocabulary word from a short list of multiple choice options), recall (e.g., given a short definition, determine whether it is true or false), or basic procedural application (e.g., correctly number the order of steps associated with a given task).

Researchers, however, have developed a variety of approaches for better assessing higher-order skills; these include the use of Behaviorally Anchored Rating Scales (BARS), rubrics, concept maps, card sorting tests, Situational Judgment Tests (SJT), metacognitive prompts, and self/team-correction. CoL V1.0 employs several

of these assessments in creative ways that function via the instructor-less e-learning. These include the following:

- Concept maps with drop-down boxes
- SJTs designed as multiple-choice tests
- Card sorting using radio buttons
- Open-ended (i.e., text areas) metacognitive prompts that are not graded, but instead facilitate formative (self-)assessment

Future versions of the CoL will include additional higher-order assessment approaches, as well as more dynamic feedback mechanisms.

Enhanced Motivation

Successful curricula engage students and present material in a way that helps learners contextualize the content. To better frame the online learning material, each 100-level CoL V1.0 course begins with a multimedia vignette about a historic (or historically based) event that established the need for the joint policies that the rest of the lesson covers. These historical vignettes are intended to convey the relevance of the course material, describe the rationale behind the joint doctrine, and engage students through the use of interactive media, storytelling, and history.

Mastery learning. In the CoL V1.0, summative assessments³ are conducted immediately following each course. The test items for each summative assessment are associated with course TLOs and ELOs, and post-test items are randomly selected from the same test bank as the pre-test items. Students who did not already pass the course at the pre-test stage must successfully complete the summative assessment in order to pass each CoL course. The CoL employs a mastery learning approach. As such, in V1.0 of the CoL students were required to score 100% on post-tests in order to successfully complete a course.

³ Summative assessments are formal tests used to measure cumulative learning outcomes, such as at the end of a course. They facilitate the go/no-go decision on whether a student has adequately completed the course, and they reinforce the knowledge and skills gained throughout a curriculum.

Enhanced Relevance

In the first version of the CoL, some personalization was incorporated. Students begin courses by completing a diagnostic knowledge test and, depending upon their scores, are able to take or skip certain modules. This diagnostic not only tailors course content to each trainee's knowledge and information gaps, but to a limited extent, it also enhances students' motivation by allowing them to omit training they have already mastered. Future versions of the CoL will feature additional adaptive learning components.

Enhanced Usability

To enhance usability, students received a system-generated email that included a secure link to the

online courses. For the CoL V1.0, each participant's name was manually entered into the system, which then generated the introductory email.

Chapter Summary

This chapter described the conceptual design and concept of operations for the CoL, which includes web-based instructional technologies, blended learning mechanisms, and associated development and execution processes. This chapter ended with a brief description of Version 1.0 of the system, which primarily included prototypes for the individual online courses. The effectiveness of these prototype components was evaluated in a beta test at PANAMAX 2012, and this is described in the next chapter.



CoL VI.0 BETA TEST

PANAMAX 2012 (PMX12), a US Southern Command (US SOUTHCOM) multinational training exercise, provided an opportunity to beta test the first version of the CoL. Data collection took place 20 May–17 Aug 2012, and throughout the beta test, the research team documented the efficacy of the CoL through a multi-part experiment, examining the learning effectiveness of the courses as well as their usability, motivational effects, operational relevance, and ability to engender a “joint mindset.” The team also documented the extent to which courses impacted the staff members’ PMX12 operational performance.

Method

PANAMAX Exercise

PANAMAX is an annual training event in which over a dozen countries participate. The exercise involves the Panama Canal and typically features scenario elements involving illegal trafficking, drug trafficking, terrorism, and natural disasters. Personnel from nearly 20 countries participated in this year’s PANAMAX. These interorganizational and multinational staff members collectively addressed a variety of simulated threats and practiced their planning and coordination skills during the week-long exercise in August 2012.

Research Design

The beta test compared learning outcomes and feedback obtained from US PMX12 participants who completed the CoL online beta modules (i.e., the experimental group) to those participants who did not (i.e., the control group). This evaluation examined the courses’ learning effectiveness, ability to engender deeper thinking, learning efficiency, operational relevance, motivational qualities, and usability.



U.S. Army Lt. Col Ricardo Bautista briefs military officials at the start of Panamax 2012 (Photo by Sgt. 1st Class Alex Licea)

SECTION SUMMARY

CoL VI.0 was empirically evaluated at PANAMAX 2012 ($N = 196$ US personnel).

Participants rated their previous online learning experiences slightly below “neutral” on a five-point scale ($M = 2.87$).

Participants rated the CoL slightly above “neutral” on a similar five-point scale ($M = 3.24$).

Participants who completed the CoL scored, on average, 21% better on the knowledge test versus participants in the control group ($p = .001$).

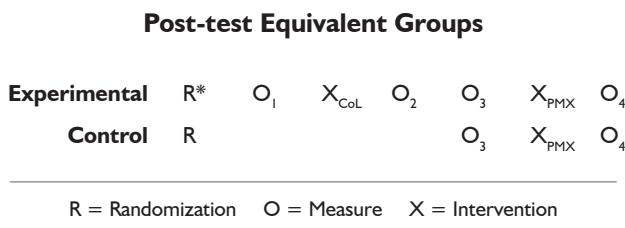


Figure 4.1. Experimental diagram of the CoL study. The R* signifies that nonrandom factors may have unintentionally influenced initial selection of eligible experimental participants. Military leadership necessarily determined which participants were able to participate in the experimental group. This may have created a nonrandom population; further, members of this population could self-select out of the experiment by attrition (i.e., not completing the online beta courses). However, once integrated into the experiment, individual participants were targeted randomly. O₁ and O₂ represent online testing opportunities, while X_{CoL} signifies the online beta courses. O₃ represents those measurement opportunities that occurred just prior to the PANAMAX exercise, and O₄ indicates those that occurred immediately following it, while X_{PMX} represents the exercise, itself.

Additionally, within the experimental and control groups, we also assessed potential demographic differences related to rank and service.

The study used a experimental post-test design, with qualitative surveys and objective tests given to equivalent experimental and control groups. As shown in Table 4.1, data were collected at multiple dates, however, not all of these dates

reflect repeated measures. Instead, some simply represent different scheduled opportunities to interact with various portions of the population. To clarify, Figure 4.1 shows a simplified experimental diagram, and Figure 4.2 visually depicts how the CoL components interacted with the PANAMAX 2012 Joint Exercise Life Cycle (JELC).

Measures

Participants completed a variety of knowledge and reactions questionnaires at several points before and after the PANAMAX exercise. The experimental design is illustrated in Table 4.1. This subsection describes each of these apparatus in detail.

Demographics. A demographics survey asked a range of biographical questions, including experience with joint exercises, interagency/multinational planning, and related training. All participants received the same demographics questionnaire, either at time O₁ for the experimental group or time O₃ for the control group (see Figure 4.1). We hypothesized that some demographic variables might contribute to success on the knowledge tests or in framing personal reactions; hence, these data were analyzed as potential covariates across the other questionnaires.

Table 4.1. Experimental design overview showing data collection opportunities (top), participant groups (left), and the data collection interventions designed to target each combination

		20 May–2 August Online Courses	11–12 July Tier I Academics	29 July–2 Aug Tier II Academics	8–17 Aug PANAMAX
Experimental		<ul style="list-style-type: none"> Informed consent CoL course completion data Demographics Content knowledge test Opinions towards previous e-learning survey Post-CoL reactions survey 	<ul style="list-style-type: none"> Content knowledge test Joint mindset survey Post-academics reactions survey 	<ul style="list-style-type: none"> Content knowledge test Joint mindset survey Post-academics reactions survey 	<ul style="list-style-type: none"> Post-exercise reactions survey
Control	N/A		<ul style="list-style-type: none"> Informed consent Demographics Content knowledge test Opinions towards previous e-learning survey Joint mindset survey Post-academics reactions survey 	<ul style="list-style-type: none"> Informed consent Demographics Content knowledge test Opinions towards previous e-learning survey Joint mindset survey Post-academics reactions survey 	<ul style="list-style-type: none"> Post-exercise reactions survey

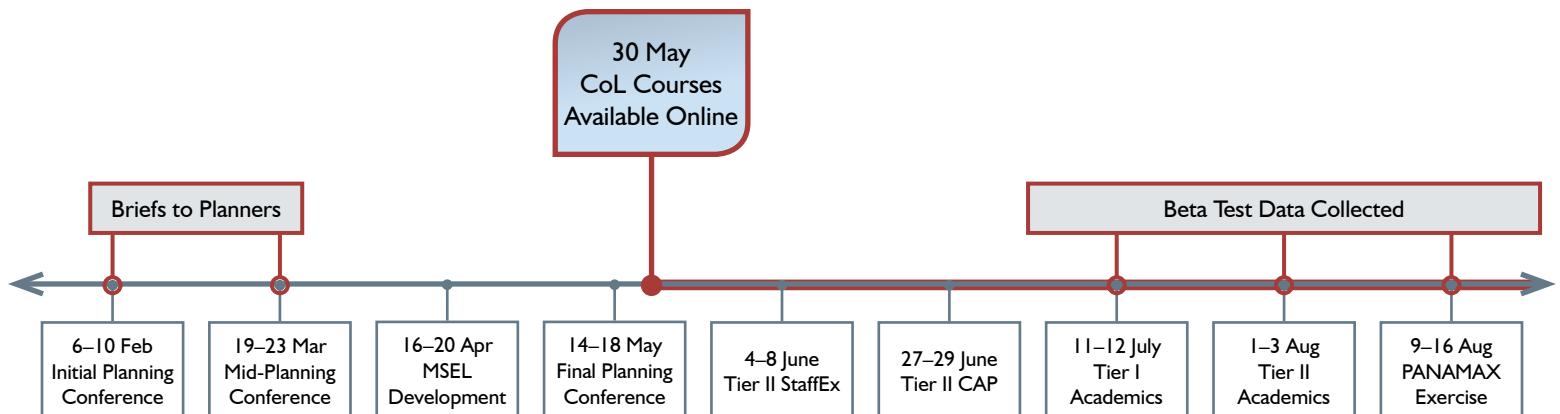


Figure 4.2. Simplified version of the PANAMAX 2012 Joint Exercise Life Cycle (JELC), with CoL beta test events inserted. The white boxes on the timeline depict the standard exercise events, from planning (on the left) through to exercise execution (on the right). The boxes above the timeline show CoL activities, including pre-exercise planning, delivery of the online courses, and data collection.

Content knowledge tests. Experimental participants completed pre- and post-course knowledge tests prior to and immediately following the CoL courses (i.e., at times O₁ and O₂ on Figure 4.1). These knowledge tests are part of each CoL course, regardless of this study, but we also used their outcome data to inform our analysis.

In addition, all participants completed a cumulative knowledge test prior to the exercise (at time O₃). The control and experimental group tests were identical and covered a range of interagency/multinational planning topics. These 18-item multiple choice tests were intentionally designed to be very challenging in order to avoid ceiling effects. All the tests were scored and reported as percent correct out of 100%.

Opinions towards previous e-learning survey. All participants completed the same survey regarding their past experiences with military e-learning, at time O₁ for the experimental group and time O₃ for the control group. The questionnaire asked participants to rate 19 items on a 5-point scale ranging from “never” to “always.” Items addressed concepts related to *effectiveness* (e.g. “online courses made me think deeply, like engaging in creative problem-solving”), *relevance* (e.g., “online courses were intentionally linked to specific operational events or future missions”), *efficiency* (e.g., “online courses required me to re-take material that I already knew”), and *satisfaction* (e.g., “online course content held my interest”).

my interest”).

Participants also responded to five open-ended questions, which asked them to identify gaps in military online learning, describe how effectively military online courses encourage the development of critical thinking skills, offer opinions of pre-tests, assess the usefulness of participating in online simulation, and provide general recommendations for improving online courses. Individual responses related to each concept were aggregated and reported on a 5-point scale, and the open-ended questions were assessed for qualitative trends.

Post-CoL reactions survey. Experimental participants completed a reactions questionnaire about the CoL upon finishing the CoL beta courses, i.e., at time O₂. The questionnaire asked each participant to rate 21 items on a 5-point scale, ranging from “strongly disagree” to “strongly agree.” These items correspond with the opinions-towards-online-learning survey, described above. The items addressed concepts related to *effectiveness* (e.g., “the online course prepared me for operating in a joint/multinational environment”), *relevance* (e.g., “the online course was relevant to my operational duties”), *efficiency* (e.g., “the training course required too much time to complete”), and *satisfaction* (e.g. “the online course content held my interest”).

The questionnaire also asked participants to respond to three open-ended questions about the most and least important topics covered in the on-

line courses, any technical difficulties experienced, and any additional comments relevant to the online courses. Individual responses related to each concept were aggregated and reported on a 5-point scale, and the open-ended questions were assessed for qualitative trends.

Joint mindset survey. All participants completed a survey regarding their experiences with and opinions on working in joint environments at time O₃. The questionnaire asked participants to rate 19 items on a 5-point scale, ranging from “weekly” to “never.” Items addressed *knowledge of joint principles* (e.g., “Learn new joint principles and procedures”), *knowledge of joint procedures* (e.g., “Outline specific ways that an OPLAN or CONPLAN affects others outside the US”), *education on core joint ideas* (e.g., “Receive formal instruction addressing joint principles and procedures in class or online”), *interpretation of joint concepts* (e.g., “Do you have a different interpretation than coworkers of joint values and ethics”), and *service-mindedness* (e.g., “Use own-Service specific language or slang around coworkers from other services”).

The questionnaire also included five open-ended questions about the definition of a “joint mindset,” traits important to a “joint mindset,” comfort in using joint terminology, preparedness to communicate with interagency and multinational individuals, and comfort with joint policies and procedures. All of the scaled questions were aggregated and the overall average was reported on a 5-point scale. The open-ended questions were assessed for qualitative trends.

Post-academics reactions survey. All participants received similar, but slightly different, reaction questionnaires at time O₃, in order to collect feedback about their experience with the traditional face-to-face PMX12 academic sessions.

The experimental participants’ version of the survey asked them to rate 12 items on a 5-point scale, ranging from “strongly disagree” to “strongly agree.” These items addressed concepts related to *preparedness* (e.g. “The online courses better prepared me for these joint operational planning

discussions”), *coordination* (e.g., “The academics included content related to multinational coordination”), *value* (e.g., “Overall, the online courses were a valuable supplement to the academics”), and *effectiveness* (e.g., “Overall, I learned new joint operating approaches from the online courses”).

The questionnaire also asked participants to respond to three open-ended questions to assess the perceived usefulness of the online courses, necessary improvements for online training, and any additional comments relevant to the online courses associated with PANAMAX or e-learning on JKO. Individual questions related to each concept were aggregated and reported on a 5-point scale, and the open-ended questions were assessed for qualitative trends.

Similarly, the control participants’ reactions questionnaire asked them to rate seven items on a 5-point scale, ranging from “strongly disagree” to “strongly agree.” These items addressed concepts related to *preparedness* (e.g. “I felt like I could meaningfully contribute to the discussions during academics”) and *potential value of an online pre-course* (e.g., “I would recommend that staff complete basic information online before the academics”). The questionnaire also provided participants with five open-ended questions to assess perceived usefulness of an online course and describe the preparedness of other staff members. Individual questions related to each concept were aggregated and reported on a 5-point scale, and the open-ended questions were assessed for qualitative trends.

Post-exercise reactions. All participants received similar, but slightly different, reaction questionnaires at time O₄, in order to collect feedback about their experience with the PMX12 exercise.

Experimental participants completed a version of the survey that included items primarily focused on how effectively they believed the pre-exercise online courses had prepared them for the exercise. The questionnaire asked participants to rate 15 items on a 5-point scale, ranging from “strongly disagree” to “strongly agree.” These items addressed *preparedness* (e.g., “The online courses better prepared me for Joint Operational Plan-

ning in PANAMAX”), *participation* (e.g., “During PANAMAX, I personally participated in interorganizational coordination”), *effectiveness* (e.g., “Overall, I learned new Joint operating approaches from the online courses”), and *value* (e.g., I got more out of PANAMAX because I completed the online courses”).

The questionnaire also included six open-ended questions, prompting participants to describe all of the pre-exercise activities they completed, the value of those activities, recommend alternative activities, how helpful the online courses were in completing duties during PANAMAX, recommendations for online training, and additional comments. Individual responses related to each concept were aggregated and reported on a 5-point scale, and the open-ended questions were assessed for qualitative trends.

Control participants also completed a version of the post-exercise reactions survey regarding the perceived effectiveness of the standard pre-exercise activities. The questionnaire provided participants with four open-ended questions, asking them to describe what pre-exercise activities were completed, the value of those activities, recommend alternative activities, and provide any additional comments relevant to pre-PANAMAX training in general. All the questions were assessed for qualitative trends.

Course completion information. In addition to collecting participant questionnaires, we also logged technical data on the experimental participants’ CoL course completion rates. This technical information included a count of the number of participants who completed the CoL courses, the number of people who were assigned to take the CoL courses, and when participants completed the courses. We also logged and analyzed efficiency factors related to course completion, including pre-test pass/fail rates, number of post-test re-takes before passing, and completion time.

Participants

US joint military personnel involved in the PMX12

exercise were recruited to participate in this study ($N=196$). Just over 100 participants ($n = 106$) completed the experimental CoL and some portion of the experimental battery. The others ($n = 90$) participated as a control group. However, not all participants completed all measurements; consequently, the numbers per analysis vary.

Because participants were active and reserve military members, recruitment was coordinated with their leadership at USSOUTHCOM headquarters (Doral, FL) and US Naval Forces Southern Command (Mayport, FL).¹ These commands each identified approximately 50 exercise participants, who were then asked to become the experimental group (although they could opt-out of the data collection). All other US exercise participants were able to participate as control group members.

Demographic data were examined as possible correlates and/or covariates to knowledge test, joint mindset, and reaction survey scores. Significant demographic differences did exist based on rank and previous service designation for several of the questionnaires. Therefore, these variables were controlled for in analyses, where appropriate (indicated in each analysis description). The data were also checked for significant outliers on each outcome variable, and statistically meaningful outlying responses (more than two standard deviations from the mean) were discarded. An overview of relevant demographic variables is presented in Table 4.2.

CoL VI.0 Beta Test Components

Experimental group participants completed three online CoL courses prior to PMX12:

- JFC 100 Joint Operations Planning
- JFC 100 Interorganizational/Multinational
- JFC 200 Interorganizational Coordination

¹ USSOUTHCOM, located in Doral, Florida (i.e., Miami), is the is one of nine unified Combatant Commands (CCMDs) in the Department of Defense. SOUTHCOM headquarters supports Tier 1 level decision-making. Naval Forces Southern Command (NAVSO), located at Naval Station Mayport, is the Naval element of SOUTHCOM, and it performs Tier 2 level decision-making under the direction of SOUTHCOM leadership. During PMX12, NAVSO also hosted the Multinational Forces South (MNFS) component of the exercise.

These particular courses were selected by US SOUTHCOM leadership because of their relevance for the exercise. Beta-test modules became available online in time to support USSOUTHCOM and Multinational Force South (MNFS) pre-exercise academics as well as the collective PANAMAX exercise, itself.

Results

Course Completion Data

Technical information regarding course completion was logged and output by the JKO learning management system. This information included a count of the number of participants who completed the CoL and the dates each participant began and completed the modules. The digital log also reported efficiency factors, including pre-test pass and fail rates and participants' completion times. Table 4.3 provides an overview of the logged data.

Content Knowledge Test

Significant differences were found on the knowledge test based on rank (categorized into lowest, mid, and high) and Service (US Air Force, US Navy, US Marine Corps, and US Army). Therefore, all analyses performed with the knowledge test controlled for rank and Service as covariates. No other demographic variables showed significant differences.

Outcomes from a univariate between-subjects ANCOVA, controlling for rank and Service, indicate that there was a statistically significant difference between the control ($n = 47, M = 48.83\%$) and experimental ($n = 57, M = 59.09\%$) groups on the knowledge test, $F(2, 48) = 8.58, p = .001$. Figure 4.3 provides a graphical representation of scores for the experimental and control groups separately.

Covariates. As stated previously, a one-way ANOVA and accompanying post-hoc tests indicate statistically significant differences existed between personnel based upon the Service designations. Specifically, personnel from the US Army

Table 4.2. Participant characteristics

N	Experimental Group = 106 Control Group = 90
Status	Active Duty: 52.94% Reserve: 42.65% Retired Military: 1.47% Civilian: 2.94%
Average years served	Active Duty: 12.43 years Reserve: 7.79 years
Gender	Male: 80.28% Female: 19.72%
Rank	Low (E4-E5, O1-O2): 11.69% Mid (E6-E7, O3-O4): 58.44% High (E8-E9, O5-O6): 29.87%
Service designation	US Navy: 41.67% US Marine Corps: 6.25% US Army: 25.00% US Air Force: 27.08%
Current joint status	Serving in joint billet: 47.83% Not serving joint billet: 52.17%
Time in current billet	$M = 2.07$ years

Table 4.3. Technical information related to CoL course completion and efficiency rates, aggregated by the JKO learning management system.

CoL Course Completion Information	
Completed CoL courses	$N = 106$
Course completion dates	15 May – 10 August 2012
CoL Course Efficiency Information	
Average pre-test scores	$M = 42.03, SD = 17.02$
Pre-test pass/fail rates	Pass: 15.09% Fail: 84.91%
Number of post-test re-takes before passing	$M = 3.84$
Average completion time for all three CoL courses, including the experimental apparatus*	$M = 9.94$ hours $SD = 70.64$ minutes

* Note: Many participants began a CoL course, left their e-learning portal open, and then completed the course much later (sometimes as much as 10 days later). Consequently, completion times over 20 hours were dropped from this calculation. Similarly, completion rates less than 8 minutes were dropped; these short durations suggest that a participant merely looked at a course and returned later to complete it.

performed significantly higher on the knowledge test than personnel from US Navy and US Marine Corps, $F(3, 48) = 2.306, p = .019$ and $p = .022$, respectively, and US Air Force personnel performed the poorest (see Figure 4.4).

A one-way ANOVA and accompanying post-hoc tests also indicate significant differences between the lowest ranking participants and the mid and highest ranking participants on the knowledge test. The mid ($M = 53.01\%$) and highest ($M = 54.7\%$) ranking participants performed significantly higher on the test than the lowest ranking participants ($M = 43.52\%$), $F(2, 48) = 2.850, p = .043$ (low vs. mid) and $p = .017$ (low vs. high). Figure 4.5 provides a graphical representation of knowledge test scores for the three rank categories.

Opinions Towards Previous e-Learning Survey

All participants completed a survey about their opinions towards military e-learning, in general. The mean and standard deviation for the entire survey were calculated: $M = 2.87, SD = 0.93$. Next, values for each informal subscale were calculated. *A priori*, this survey was subdivided into questions that targeted efficiency ($n = 4$), relevance ($n = 3$), effectiveness ($n = 6$), and satisfaction ($n = 3$). Responses from each reaction area were aggregated across all participants and reported as mean scores. No significant differences were noted between the control and experimental group participants, or for any demographic variable (see Table 4.4).

Post-CoL Reactions Survey

After completing the online CoL courses, experimental participants responded to a reactions survey. The mean and standard deviation were determined for the overall survey: $M = 3.24, SD = 0.88$. Next, as with the opinions towards previous e-learning survey, the subscales were analyzed.² The post-CoL learning reactions survey targeted each one of the

² Although the opinions towards previous e-learning and post-CoL reactions surveys addressed the same constructs, because of their different delivery contexts, not all items on these apparatus were identical. See the Appendix to review specific differences in the wording on the two apparatus.

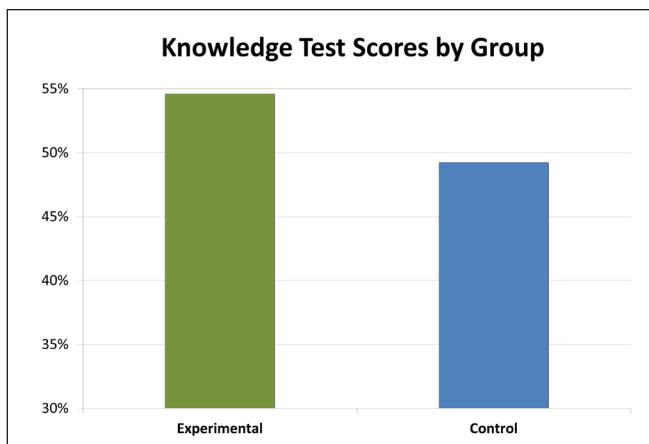


Figure 4.3. Average scores for experimental and control groups on the knowledge test given at the beginning of PMX12

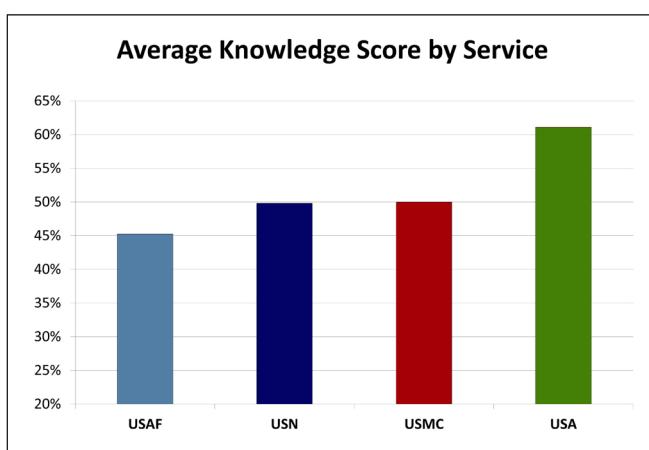


Figure 4.4. Average scores by military Service designations on the content knowledge test, aggregated across experimental and control groups

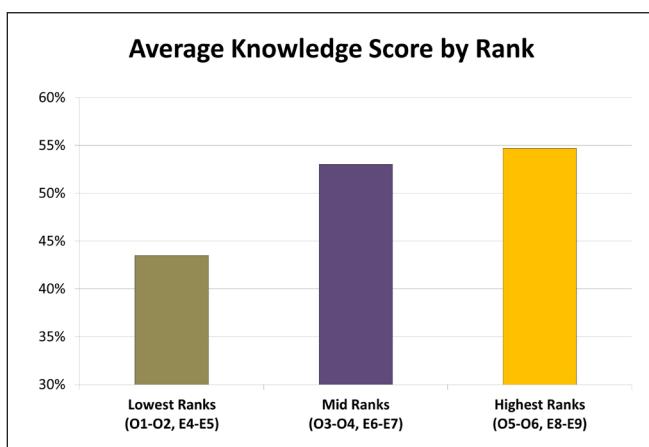


Figure 4.5. Average scores by rank categories on the content knowledge test, aggregated across experimental and control groups

Table 4.4. Responses from the control and experimental participants' about their previous e-learning experiences (i.e., military e-learning experiences *not* including the CoL courses).

Opinions Towards Previous e-Learning Survey	
I = Never, 2=Rarely, 3=Sometimes, 4=Frequently, 5=Always	
Online learning is <i>Efficient</i>	<i>M</i> = 2.76
Online learning is <i>Relevant</i>	<i>M</i> = 3.14
Online learning is <i>Effective</i>	<i>M</i> = 3.03
I am <i>Satisfied</i> with online learning	<i>M</i> = 2.39

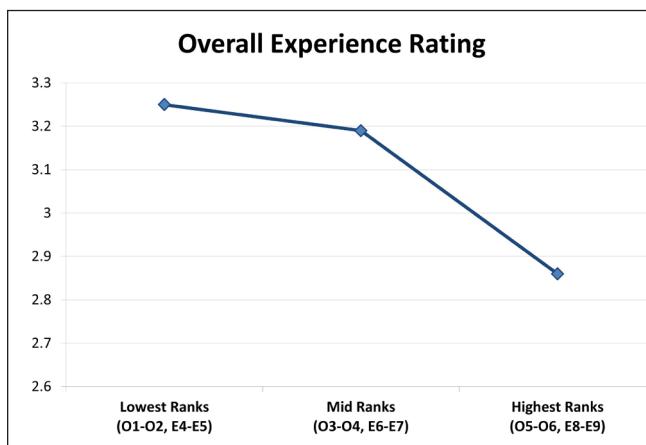


Figure 4.6. Average response scores for post-online learning reactions by rank category

same four areas as the opinions towards previous e-learning questionnaire. Again, responses from questions targeting each reaction area were aggregated across all participants and reported as mean scores. No significant differences were noted for any demographic variable. Table 4.5 provides an overview of average responses in regard to post-online learning reactions. The post-CoL reactions survey also asked several additional questions related to the CoL modules, specifically (see Table 4.6).

Covariates. When assessing the overall post-CoL reactions survey score, one-way ANOVAs indicated statistically significant differences by rank (divided into low, mid, and high). Overall, the lower the rank, the more positively the participant rated the course overall ($F(2, 76) = .411, p < .05$).

- Lower ranks: $M = 3.25$
- Mid ranks: $M = 3.19$
- Highest ranks: $M = 2.86$

Table 4.5. Responses from the experimental participations about their reactions to the CoL courses, delivered immediately after course completion

Post-CoL Reactions Survey	
I = Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly agree	
Online learning was <i>Efficient</i>	<i>M</i> = 3.28
Online learning was <i>Relevant</i>	<i>M</i> = 3.51
Online learning was <i>Effective</i>	<i>M</i> = 3.27
I was <i>Satisfied</i> with online learning	<i>M</i> = 2.84

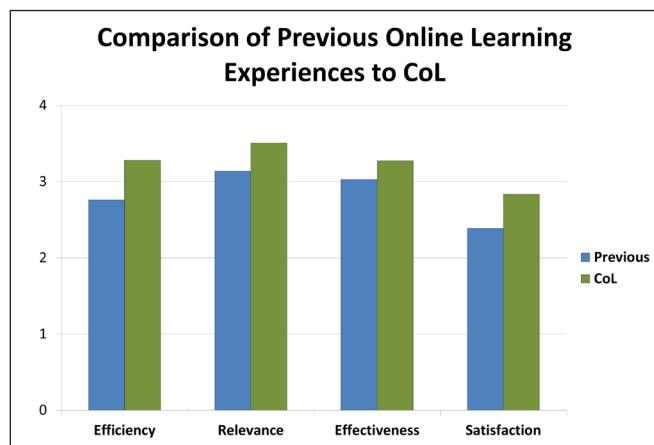


Figure 4.7. Scores on the opinions towards previous e-learning survey compared to the post-CoL reactions survey

Figure 4.6 provides a graphical representation of this difference between ranks.

Comparison of Previous e-Learning to CoL

Paired samples *t*-tests indicated statistically significant differences between the participants' previous online learning experiences and the CoL online experience. The participants rated the CoL courses more positively than their previous experiences in every area.

Table 4.6. Responses for the additional, CoL-specific items in the post-CoL reactions survey, completed by the experimental participants immediately following CoL course completion

Additional CoL Online Learning Experiences	
Where I = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly agree	
The course required too much time to complete	<i>M</i> = 3.51
The course modules were easy to navigate	<i>M</i> = 3.62
The course provided more engaging training than other forms of instruction	<i>M</i> = 2.82

- Efficiency: $t(1,72) = 4.482, p < .000$
- Relevance: $t(1,70) = 3.165, p = .002$
- Effectiveness: $t(1,72) = 2.183, p = .032$
- Satisfaction: $t(1,72) = 4.928, p < .000$

Figure 4.7 shows the average opinions towards previous e-learning survey as compared against the post-CoL reactions survey.

Joint Mindset Survey

When assessing overall joint mindedness scores, no statistically significant differences were found between the control ($M = 2.14$) and experimental ($M = 2.29$) groups, based on outcomes from a one-way ANOVA ($p > .05$). Therefore, we aggregated the joint mindset survey scores across groups, in order to gain additional statistical power, and re-evaluated the scores for meaningful correlates. Outcomes from an additional one-way ANOVA showed no statistically significant difference in joint mindset based on participants' Service or rank (both $p > .05$).

Several interesting trends, however, were identified. First, overall, joint personnel learn, think about, or use joint concepts about once a year ($M = 2.23$, where 2 = yearly, 3 = monthly). More specifically, personnel receive or seek out knowledge related to joint principles a little more than once a year ($M = 2.21$). They take personal action to increase their joint mindedness several times a year ($M = 2.42$), and they perform joint-specific work functions about once a year ($M = 2.00$). See the Appendix ("Joint Mindset Survey" on page 56) for the complete listing of items and outcome data for this apparatus.

Post-Academics Reactions Survey

Because the experimental and control groups' questionnaires differed for post-academics reactions, they cannot be directly compared. However, several concepts were similarly assessed and can be reviewed independently. Based on one-way ANOVAs, there were no significant within-subjects differences for any demographic variable for either group (all $p > .05$).

Overall, experimental participants agreed that the online courses prepared them for contributing to the academics portion of the exercise (overall $M = 3.89$, where 4 = agree). Additionally, they would recommend that staff complete the online courses before academics (Question 11; $M = 3.92$, where 4 = agree) and felt that the courses blended well with the academic session (Question 10; $M = 4.00$, where 4 = agree).

Control participants felt only moderately prepared for, and confident in contributing to, the academics portion of the exercise ($M = 3.27$, where 3 = neutral). Also, 36% of the control respondents agreed or strongly agreed that an online pre-training program might have been beneficial.

Post-Exercise Reactions Survey

As with the post-academics reactions questionnaires, the experimental and control groups' surveys differed for post-exercise reactions, and therefore, cannot be directly compared. However, several concepts were again similarly assessed and can be reviewed independently. Based on one-way ANOVAs, there were no significant within-subjects differences for any demographic variable for either group (all $p > .05$).

Similar to the post-academics reactions, experimental participants felt that the online courses prepared them for contributing to the exercise (overall $M = 4.26$, where 4 = agree and 5 = strongly agree). Additionally, they felt that the online courses were a valuable supplement to the exercise (Question 12; $M = 3.50$, where 4 = agree) and that the courses were a logical first step in the PANAMAX pre-exercise work-up (Question 13; $M = 3.82$, where 4 = agree).

Control participants again felt moderately prepared for, and confident in contributing to, the exercise ($M = 3.21$, where 3 = Neutral).

Free-Response Qualitative Results

Several questionnaires included open-ended items, which provided opportunities for participants to provide more detailed responses in addition to the

Table 4.7a. In their reactions surveys, participants were prompted to provide free responses about their e-learning experiences. Two experimenters independently reviewed and classified these responses by their content. The most frequently mentioned complains (or compliments, see row 4*) are listed in the table below, along with the percentage of participants who mentioned that issue.

Frequently Mentioned Issues	Previous e-Learning Percentage of respondents (control and experimental) commenting on this issue on the opinions towards previous e-learning survey	CoL Courses Percentage of respondents (experimental) commenting on this issue on the post-CoL reactions survey
Online courses had technology problems, e.g., logging in and browser crashing	35.71%	21.50%
Online courses took too long to complete	30.00%	7.48%
Online courses were not relevant	22.86%	19.63%
Online courses were effective in developing and/or using critical thinking skills*	10.00%	23.36%
Online courses were not personal, lack interaction	27.14%	9.25%

scaled items. For each questionnaire, two researchers reviewed the data, categorized the most common responses, and tallied the percentage of participants who provided feedback that aligned with each general category. A review of the most prevalent responses on each questionnaire is provided below; see the Appendix (“Qualitative Responses” on page 41) for a complete listing of all participant qualitative responses.

Opinions towards previous e-learning and post-CoL reactions surveys. First, we compared the experimental participants’ qualitative feedback on the post-CoL reactions survey to all responses on the previous e-learning survey. Overall, participants consistently provided more positive feedback about the CoL courses than about their previous online learning experiences. Tables 4.7a and 4.7b provide an overview of the most common types of feedback across both questionnaires and the percentage of participants who mentioned each issue.

Post-academics and post-exercise reactions surveys. We assessed the post-academics and post-exercise data using the same method as above. Again, several feedback categories were prominent, and the percentage of respondents providing similar responses was tallied for each. Tables 4.8a and 4.8b provide an overview of the most common types of feedback on these questionnaires.

Table 4.7b. The list below summarizes some of the additional comments that expand upon, or are in addition to, the items summarized in Table 4.7a. Each issue below was reported by at around 20% of the participants. In this table, the experimenters paraphrased participants’ comments except where noted with quotation marks; those items use one of the participant’s words.

Opinions Towards Previous e-Learning Survey

- Access: CAC login, bandwidth problems
- Tedious or redundant (20.00%), Too many courses (7.14%), Outdated (7.14%)
- Best courses for crit thinking: Captivity, SERE 100, Scenario-based, Info Assurance
- “Just clicking through to get it done,” “Mostly multiple choice and regurgitating information,” “Just checking memorization abilities,” “Becomes ‘order of the day’”
- “Quizzes are not interaction”
- “Extra practice is always good”
- “Needs to closely align with exercise to be effective”
- Navigation is often confusing
- Multiple choice often too easy, only requires skimming
- Many times, assessment consists of same questions as everyone else, or last year
- Often requires too much mastery learning
- “In general, military online training is a waste of time”
- Innovative, relatable, relevant, and interactive training would be better

Post-CoL Reactions Survey

- Froze, inaccessible login, timeouts, next button not working
- Too extensive, just want basics
- “Portrays big picture”
- Pictures, videos, real-world analogies good
- Break into smaller segments
- Assessments asked for too much mastery learning
- Largely done on personal time
- Decrease assessments and use simulation-based exercises to validate learning

Table 4.8a. In their post-academics and post-exercise reactions surveys, participants were prompted to provide free responses about whether pre-training online courses would have (control group) or actually did (experimental group) enhance their experiences. Two experimenters independently reviewed and classified these responses by their content. The most frequently mentioned responses are listed in the table below along with the percentage of participants who offered that comment.

Frequently Mentioned Comments	Control Group	CoL Experimental Group
Online pre-training would have been (or was) beneficial	67.50%	91.67%
Participant felt prepared for academics or exercise	17.50%	81.79%
Participant felt rushed to complete training requirements prior to exercise	68.18%	71.23%

Discussion

This beta test was conducted as part of a larger-scale initiative designed to improve collective training by using web-based and blended learning approaches. Data collection occurred during delivery of the online courses, pre-exercise academic sessions for Tiers I and II, and at the PANAMAX exercise in Mayport and Doral, FL. Our main goal for this test was to compare learning outcomes and feedback obtained from US PANAMAX participants who completed the CoL online training beta modules (i.e., the experimental group) to those participants who did not (i.e., the control group). This section of the report summarized the key finding, which were described statistically, above.

Content Knowledge Test

The post-course/pre-exercise summative knowledge assessment indicated significant differences between participants categorized in three ways. First, as can be expected, higher-ranking participants scored better than middle ranks, who scored better than lower-ranking participants. Also, significant differences existed between participants from different Service backgrounds. Specifically, Army personnel performed better than Navy and Marine Corps participants, who performed better than Air Force participants. The differences between Services may not seem as easily explained as the differences in rank. However, anecdotal evidence suggests that Army personnel have more opportunities to engage in joint operations, and that much of the joint doctrine resembles Army doc-

Table 4.8b. The list below summarizes some of the additional comments that expand upon, or are in addition to, the items summarized in Table 4.7a. Each issue below was reported by at around 20% of the participants. In this table, the experimenters paraphrased participants' comments.

Common Control Participant Responses

- Online training could include knowledge of partner nations' rank structure, skills, military customs
- Would have liked review of vocab, joint doctrine
- Suggested topics: Functional area-specific, who's who for exercise, exercise support flow
- Academic SMEs knowledgeable, but unable to convey info to wide audience
- Job relevant content might cause trainees to care more about CBT
- Discrepancies between trainee knowledge and skills negatively impact training

Common Experimental Participant Responses

- Some parts too macro, would like more practical exercises within program
- Helped understand planning process, applied joint ops, good review of vocab/joint concepts
- More real world examples, scenarios, best practices, lessons learned
- Need more ways to "show" doctrine in application

trine. Consequently, these Service members are exposed to joint concepts earlier and more frequently.

Most importantly, however, the experimental participants outperformed the control group by 21% (when controlling for the effects of rank and previous service designation), demonstrating the CoL as a successful learning tool.

Opinions Towards Online Learning and Post-CoL Online Learning Reactions

When asked about previous online learning experiences, all the participants (control and experimen-

tal combined) reported that online curricula are only sometimes efficient, relevant, effective, and satisfying. In comparison, in response to a conceptually similar questionnaire, the experimental participants agreed that the CoL training experience was significantly more efficient, relevant, effective, and satisfying than their previous experiences.

However, the experimental participants also specified that the CoL courses took too much time to complete, especially considering it was necessary for most participants to complete the training off-duty. They also indicated that the CoL courses were not necessarily more interesting than other forms of instruction, demonstrating the opportunity to improve the courses in following iteration(s). These opportunities are discussed further in the section below, titled Suggested Revisions to CoL V1.0.

Attitudes Towards Joint Operations

All the participants (control and experimental) were asked about joint concepts, skills, and training. We termed this collectively as “joint mindset.” Based on the responses, it appears that the personnel might benefit from further cultivation of this joint mindset. In general, personnel only think about or use joint concepts about once a year, and they receive or seek out knowledge related to joint principles only a little more than once a year. They take personal action to increase joint mindedness several times a year, and they perform joint-specific work functions about once a year. This seems to reflect the fact that most of the exercise personnel are reservists, but we believe that these areas point to opportunities for improvement. In particular, this highlights the need for training interventions that enhance retention and additional sustainment training opportunities (such as those provided by the CoL).

Post-Academics and Post-Exercise Reactions

Overall, the experimental participants confirmed the overarching goals for the CoL beta courses. The participants agreed that the courses prepared them for contributing to the academics portion of the

exercise, that they would recommend that all staff complete the online courses before academics, and that they felt that the courses blended well with the academic session. In comparison, the control participants felt moderately prepared for, and confident in contributing to, the academics portion of the exercise. Also, 36% of the control respondents agreed or strongly agreed that an online pre-course program might have been beneficial.

Similar to the post-academics reactions, experimental participants felt that the online courses prepared them for contributing to the exercise and reported that the online courses were a valuable supplement to the exercise. They also indicated that the courses were a logical first step in the PANAMAX pre-exercise work-up. Alternatively, the control participants again felt only moderately prepared for, and confident in contributing to, the exercise. Therefore, although the experimental participants offered recommendations for improving the CoL courses, the results indicate overall success in providing supplemental preparation for the PANAMAX exercise and associated pre-exercise training activities.

Suggested Revisions to CoL VI.0

The following recommendations were compiled based upon the participants’ feedback and the experimenters’ observation of participants’ performance. These comments only address suggested revisions to the CoL self-paced courses (i.e., the product-level), since those were the experimental component that the participants completed. Summative recommendations (i.e., the system-level) for the overall CoL effort are provided in the next chapter.

Learning Content

Include links to official joint doctrine and other source documents. Joint personnel are encouraged to have an applied understanding of official publications. The beta CoL included descriptions

of these publications but no access to the full documents. As indicated in the reactions results, many participants prefer to read the actual doctrine rather than just see interpreted paragraphs. Therefore, we recommend including links within the modules to the full official documents, which improves the course content for very little cost or effort.

Indicate explicit linkages between course content and application. Although the beta CoL included general explanations of content application to joint functions, the participants indicated that the courses should explain with more specificity the importance of the content. We recommend incorporating more real-world, applied examples throughout the modules, where appropriate. For instance, the system could say “if you are working in a J2 WG, then this material will help you...” Simply identifying and incorporating these functional area-specific links into each module gives the courses a more tailored and personal feel, thus increasing trainees’ motivation.

Adjust lower-level courses to emphasize general doctrinal principles and include more exercise-specific details. Many participants felt that the beta CoL courses covered too much detail in each content component. These participants reported their desire to spend more time learning basic doctrinal principles as well as more exercise-specific information, especially regarding the partner nations.

Therefore, we recommend removing some of the more detailed joint process information from the lower-level online courses and instead incorporating material that supports exercise foundations, such as an overview of the partner nations’ military culture and logistics. These components could include rank structure, skills related to personnel classifications, and general military customs, as well as a who’s who for the exercise and exercise support flow. Utilizing the training time to brief these exercise basics could improve ramp-up time at the beginning of an exercise and help each participant gain more value from the training experience.

Include as much real-world content as possible.

Most commonly, the participants expressed their appreciation for interesting design and low-level interactive components throughout each module. We recommend supporting students’ interest in the course material by increasing the number of relevant pictures, videos, charts, scenarios, historical best practices, and descriptions of lessons learned. This type of content gives courses a more tailored, personal feel, which leads to enhanced learning, and increased motivation.

Online Assessments

Offer summative testing at end of each module, rather than solely at the end of each course. Results from the knowledge tests indicated a significant increase in knowledge from pre- to post-training; however, there is room for improvement. We recommend incorporating summative measures of performance at the conclusion of each module, thereby enabling the trainees to complete the overall course in more efficient individual units. Segmenting the course to include formal testing immediately after a concept is presented, rather than presenting one lengthy test at the end of the entire course, helps to increase learning outcomes and improves retention rates.

Increase quality of formal assessments and include simulation-based validation exercises. As indicated in the reactions results, trainees felt that the summative assessment items were inconsistent. They reported that the question quality ranged from being too vague to too specific, and some questions were simply confusing. Therefore, we recommend modifying the test bank of questions to more appropriately and consistently reflect higher-level cognition, especially conceptual and applied knowledge of joint concepts. We also recommend the development and inclusion of scenario-based exercises with assessment capabilities. Modification and development of improved assessment techniques directly support the training, enabling the delivery of more targeted feedback and remediation.

Increase quality and quantity of feedback. Provid-

ing specific, tailored feedback is one of the most effective methods to increase trainee achievement in learning. Therefore, the online courses should utilize as many opportunities to provide feedback as possible. Specifically, the courses can be improved by including a discussion of each assessment question, and explanations for each answer choice, delivered when the assessment is complete. This way, the trainees can learn from correct AND incorrect responses, and remediate accordingly.

Additionally, on the CoL pre-tests, we recommend modifying the feedback for correct/incorrect items to improve clarity. Trainees expressed the need for explanations (in text) about which modules they will have to complete, and why/how they have to complete them (e.g., “you only scored 30% on Module 2, so you will need to review that section and then take a different test at the end, on which you will need to score 80% to pass”).

Motivation to Use

Recommend to commanders to provide more duty hours to complete assigned e-learning courses. A major complaint about any DoD computer-based training program is the time (or lack thereof) allowed during duty hours to complete it. Often, trainees must use personal time for training at home or after hours. As expected, doing so drastically decreases motivation to learn. We recommend advising commanders to budget an appropriate amount of hours to allow trainees to complete the course while on the clock.

Relevance

Maintain alignment with future training or events, and remain up-to-date with official doctrine. CoL beta trainees were positive about the alignment between the online courses, the academics sessions, and the exercise. The trainees felt that the online courses were an appropriate precursor to the later exercise-related activities. Additionally,

the trainees reported that the content and material was up-to-date with joint doctrine and current practices. (Simultaneously, the participants complained that many other DoD training programs were outdated or not directly applicable to specific functions or activities.) Therefore, regularly adapting the content to maintain this cohesive alignment and timeliness is highly important to the continued success of the CoL program.

Usability

Streamline assessments in CoL course. Beta-test participants reported technical problems with the assessment portions of the CoL courses. The number of post-test questions was inconsistent over multiple attempts, and hyperlinks between the module content and assessments often failed to work or routed to the wrong page. Trainees also reported frustration with the post-test remediation, which starting from the beginning of a module rather than directing back to the specific content associated with a test item.

Revise the naming scheme used in the JKO course catalogue. Participants reported difficulty finding courses in the JKO course catalogue, even though they received explicit directions on how to locate the classes. During Tier 2 delivery of the online courses, experimenters observed students referring to succinct, printed instructions but yet still struggling to use the course catalogue. To address this, individual course names should be refined to help students more easily locate them. Courses at different levels (e.g., 100 and 200) should have different course numbers that follow a pattern which is logical to an e-learning novice, and course names should adequately reflect their content. For instance, Module 8 for JFC 100 is currently unrelated to Module 8 for JFC 200, but this is not evident from their names, which the trainees found confusing. Eliminating this confusion is simple and can be completed for very little cost.



RECOMMENDATIONS

This chapter provides systemic recommendations for the future of the CoL, as well as the approach to blended individual/collective joint training. These recommendations are based upon the results of the front-end analysis (Chapter 1), spirit of the CoL conceptual design (Chapter 2), and data collected from the initial test and evaluation of CoL V1.0 (Chapter 3).

Recommendations

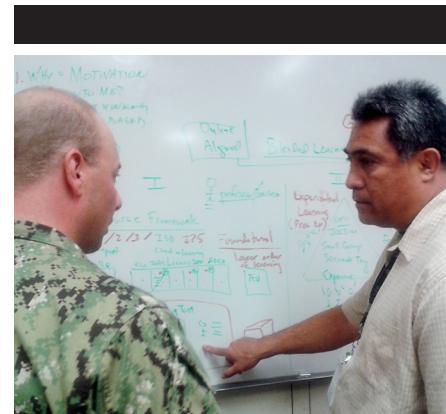
1. Revise specifications for blended learning

The CoL V1.0 initiative documented valuable research-based recommendations about how to best design e-learning and blended learning experiences (presented in the front-end analysis discussed in Chapter 1), and CoL researchers uncovered immediate feedback and recommendations from joint personnel who participated in the CoL (presented in the experimental discussion in Chapter 3). Collectively, these recommendations next need to be formalized into official instructions as well as corresponding performance checklists that stakeholders, such as ISDs and OTs, can actively use.

2. Develop blended learning-training packages

One of the recommendations described throughout this report involves blending individual learning and collective training opportunities. To help facilitate this, curriculum developers should consider blended learning-training packages for Joint Event Life Cycle (JELC) exercises. These packages should include intentional linkages, cross references, and blending guidance for OTs.

Train OTs in blended learning instructional techniques. In addition to providing tools for blended learning, it is important to teach



One of the CoL beta test participants offers recommendations for improving joint individual training to Dr. David Fautua

SECTION SUMMARY

This section offers ten high-level recommendations for the future of the CoL, and joint individual and collective training in general.

These include formally implementing the recommendations from Chapters 1–3 of this report, revising the process for assessment design, enabling new technologies on older DoD systems, and implementing enduring test and evaluation metrics for learning/training system life-cycle.

OTs how to make good use of those capabilities. OTs must learn about blended learning best practices, as well as receive training on how to most effectively use the CoL blended learning-training packages.

3. Develop an automated data “dashboard”

To further facilitate blending, as well as to give OTs and commanders more insights into personnel’s individual and aggregate readiness levels, the system the CoL utilizes should automatically process learning outcome data and present read-outs of data in an intuitively understandable format, couched in operationally applicable terminology. More specifically, we recommend the development of a data “dashboard” that automatically analyzes personnel’s learning outcomes (from the online database) and presents easily interpretable, dynamic, and interactive visual depictions of the aggregate of those learning outcomes, as well as usable quantitative scores.

The dashboard should allow OTs and commanders to easily view *relevant* performance and reaction scores. By providing an overview of aggregate student performance to the OTs prior to the execution of JELC academics, for example, OTs can present training that is more tailored to the training audience’s knowledge level. Such tailoring, supported by the dashboard, should enhance learning effectiveness (such as the depth of learning that can be attained) and learning efficiency (since less time will be spent covering basic information the audience has already mastered online). We anticipate that trainee performance in future blended learning-training packages will be strongly related to the quantity and quality of feedback provided during the e-learning portion.

4. Improve assessment development

The value of effective assessments, along with their corresponding feedback, cannot be understated. ISDs, OTs, and other training stakeholders recognize the importance of creating good assessments; however, many times stakeholders are too busy to

develop those assessments. Revised processes must adequately support those stakeholders and content owners, while ensuring that courses include reliable, valid, and diagnostic assessments for both formative and summative evaluation of learning outcomes.

5. Implement adaptive e-learning

As discussed in Chapter 1, tailoring (also called personalizing or adapting) instructional material and delivery mechanisms to better meet students’ needs can have profound impacts on learning effectiveness and efficiency, as well as learner satisfaction. Because these benefits can be gained without requiring a significant investment, adaptive e-learning can potentially yield high returns on investment. Hence, we recommend broader implementation of adaptive e-learning methods for the CoL. Below are more specific recommendations for implementing adaptive e-learning within the joint learning continuum.

Adjust courses based upon individual characteristics. Simple mechanisms can dynamically adjust course content, learning progression (i.e., the order of content), or instructional activities based upon variables, such as rank, duty assignment, or other input provided prior to beginning a course.¹ For instance, an online course might selectively include different example situations based upon which the functional area to which a student is assigned.

Adjust courses based upon group characteristics. Similarly, courses can be tailored to a specific cohort of students, such as all of the personnel completing a certain exercise. For instance, a different use-case could be selected for an online course based upon the themes associated with exercise that the group is attending. While this capability is currently available through JKO, it is not an automated process.

¹ Formally, this form of adaptation is called *macro-adaptation*. “Macro-adaptive instructional decisions occur before training actually begins” (Shute et al., 2001, p. 5). Broad adjustments to the instructional environment are made based upon data about the learner, collected prior to an instructional session. Adaptation occurs before each block or session of instruction. See VanLehn (2006) for an introduction to macro- and micro-adaptation.

Adjust courses based upon test performance. Other adaptive mechanisms can adjust e-learning content or delivery features based upon in-course performance.² For example, if a student scored poorly on a formative assessment, the system could deliver remediation targeted towards his/her specific knowledge gaps.

Facilitate automatic adaptation. Ideally, all of the adaptive mechanisms discussed in this section would occur dynamically. The learning management system should have the capacity to receive relevant variables and automatically modify courses in response to them. Standard server-side scripting and programming approaches can readily facilitate this; however, the current learning management system does not presently support these technologies. Currently, when tailored courses are developed (such as for the CoL V1.0), JKO developers must manually adjust existing course curricula and post the variants as unique course listings in the JKO catalogue.

Although implementing automatic adaptive processes does not necessarily require sophisticated software development, it may require more extensive changes to e-learning course design, necessitate additional content development, and require server upgrades. Therefore, before incorporating these additional in-course adaptive mechanisms, we recommend that a cost-benefit analysis be conducted.

6. Utilize an upgraded LCMS

To support the adaptive learning mechanisms discussed in the previous recommendation, the CoL's learning content management system (LCMS) must be upgraded beyond the scope of many older DoD content management systems. Similar upgrades are required to enable the delivery of more

sophisticated assessments, associated feedback, and the evaluation and display of assessment data via the data dashboard (recommendation 3).

7. Increase e-learning's usability and reliability

Trainees using DoD e-learning systems complain about the low reliability networks, browser-software conflicts, and other usability issues. All of these technical issues increase overall training time and frustration, while decreasing learning efficiency, interest, and motivation—potentially causing dramatic reductions to the return on investment.

In addition to utilizing a LCMS with expanded technical capabilities, the CoL's learning management system must also have high usability and reliability. To most robustly support the joint community, the CoL's LCMS must integrate with the other Services' learning management systems (e.g., so that a single trainee does not have to repeat the same training on multiple system).

Redesign course navigation to be more usable. In the CoL V1.0 beta test, the trainees frequently reported frustration with the usability of course navigation buttons, especially those between different components in a module. For example, after the introductory vignette, students must click the arrow (forward) button. This takes them to the second page of that module, which simply tells them to click on "next module" (i.e., that is the only content on page 2). Alternatively, if a student clicks on "next module" from page 1, without going to page 2, then the system directs that participant back to the beginning of the module without additional explanation. During our observations at the Tier 2 PMX testing, several students could not figure out how to get past this usability issue.

This recommendation is listed in this chapter (instead of with the product-focused recommendations of the previous chapter) because it reflects a systemic issue. The usability of military online learning experiences, in general, should be enhanced. Revising the overall navigation to increase course usability, for instance, is a relatively low-cost, low-effort approach to improve the course-

² Formally, this form of adaptation is called *micro-adaptation*. "Micro-adaptive instruction occurs during the training process" (Shute et al., 2001, p. 5). Micro-adaptation refers to on-going adaptations made during the course of one session, based upon performance or behavioral assessments (Mödritscher, García-Barrios & Gütl, 2004). For instance, a micro-adaptive system might provide feedback based on student's solution history (Ong & Ramachandran, 2005).

ware, and in turn increase instructional efficiency and student satisfaction.

Modernized relevant e-learning portals. On their reactions surveys, beta-test participants offered some recommendations about improving the web-based portals that they used to reach the e-learning courses. Simply altering small details in most web portals' graphical user interfaces will make them easier to use. For example, in a e-learning portal's course catalogue, revising course names, numbers, and organization to be more readable to the students can significantly improve the usability. (Names that makes sense to the internal development team may be confusing to the training audience and make it more difficult for them to find the classes they desire.) Consequently, we recommend conducting a usability review of portals relevant to the CoL and then redesigning their interfaces to enhance the usability for trainees.

Diagnose IT malfunctions and define solutions for improvement. As implied in the trainee reactions section (Chapter 3) and observed anecdotally by the researchers, network and server problems are a significant concern in e-learning systems. According to the beta-test participants, throughout their careers many of them had had to re-take portions of courses because of server crashes, network connectivity issues, or other technology malfunctions. Other IT struggles reported by beta-test participants included trouble logging in to the courses from home or when using a password rather than a CAC; cryptic instructions on hardware and software requirements; and even challenges when attempting to print course completion certificates.

Enhance interoperability among Services' learning management systems. Several students reported experiencing usability issues created by gaps between the various military e-learning portals, such as JKO, Army Knowledge Online, or MarineNet. For instance, one senior enlisted staff member

explained that he was required to complete the 10-hour SERE course twice in the span of a few weeks, once on JKO and once on Navy Knowledge Online. Because the two databases did not effectively share course completion information, he was unable to get Navy credit for the joint version of the course and vice versa—even though both systems used the same course content.

8. Enhance course content review processes

A more robust process for reviewing e-learning, or JOCSIM scenario, content and delivery tactics is needed to ensure all CoL courses meet a consistently high level of quality. To facilitate this, we recommend incorporating OTs into the current content review process and incorporating additional review processes to ensure that courses effectively incorporate the new CoL-based design specifications (without stifling ISDs' creativity).

9. Develop meaningful system metrics

As Joint Training adopts these recommendations and moves into its “next evolution,” it is prudent to develop associated measures of performance, measures of effectiveness, and return-on-investment criteria for these activities. W recommend developing enduring training system metrics, as well as associated testing and continuous improvement policies.

10. Test and evaluate the system

Finally, as good system engineering practice demands, system enhancements should be iteratively tested and evaluated. As new CoL components are developed, those features should be evaluated against the CoL V1.0 beta-test data. Also, a periodic (e.g., annual) test and evaluation plan should be implemented to collect ongoing data that addresses the system-level metrics (recommendation 9). This output will support continuous improvement.



APPENDIX

Appendix Contents

“Acknowledgements” on page 40

“Qualitative Responses” on page 41

“Joint Mindset Survey” on page 56

“Stakeholder Knowledge Elicitation Semi-Structure Interview” on page 57

Acknowledgements

This section includes acknowledgements from the CoL experimental report authors. Many people helped make the CoL and associated experimentation a success, and we wish to highlight some of those key personnel, here.

First, we would like to acknowledge the support of the Joint Training observer-trainers (OTs). During PANAMAX 2012, these dedicated men and women made time during their hectic training schedules to help the CoL research team integrate seamlessly into the exercise, give us insights into joint training processes, and generally act as subject-matter experts for our team. In particular, the help of LtCol Matt Deller (USAF) and LtCol Jeffrey Gardner (USA, Ret.), who were assigned to the CoL effort, cannot be understated. Similarly, the continued support from the Joint Training division, including COL Hall, COL Parrington, and Mr. Jay Reist was critical to this endeavor.

We also wish to acknowledge all of the people at Joint Knowledge Online for making this research and process development possible. JKO built the beta-test courses, and they continued to work with us throughout to refine both the products and development processes. In particular, we wish to

thank: Mr. Joe Camacho and Mr. Marty Vozzo for programmatic support; Mr. Mike Barnum and Mr. Roy “Lanny” White for leading course development and coordination throughout the project; Ms. Cattina Holt, Mr. Jarvis Rathbone, Ms. Jennifer Hanshaw, Mr. Rob Ibarra, and Mr. Damien Sanchez for their tireless effort as the ISDs who built these prototypical courses.

Many thanks to Generals Murray and Becker for their guiding leadership and support.

Finally, we would like to thank both the SOUTHCOM and NAVSOUTH staff for their willingness to provide the critical feedback and overwhelming support for these beta-test courses. Their leadership during the project, Mr. Bill Knightly, Mr. Herb Warden, COL Dallas, CDR Mershell and CDR Richardson, were critical to helping us achieve our goals.

Qualitative Responses

This section lists the participants' raw free-response reactions, which were summarized during data analysis and described in Chapter 3. These responses were collected via the Opinions Towards Previous e-Learning Survey, Post-CoL Reactions Survey, Post-Academics Reactions Survey, and Post-Exercise Reactions Survey. The results are unedited except for obvious spelling and minor grammar issues, to aid readability. No responses were cut from the list or otherwise edited.

Previous Online Learning Experiences (All participants)

In your opinion, what are the top three gaps/problems with military online learning?

- 1. Access (passwords). 2. Length of training. 3. Documenting/confirmation of completion
- 1. Access 2. Too long 3. Too many-everyday it "feels" like there is yet another CBT that you are mandated to complete
- 1. Locating course on JKO/no ease of navigation 2. Website crashing frequently! 3. Website not tracking course progress accurately!
- 1. It's online 2. Most training is multiple choice (people guess) 3. It puts people to sleep
- 1. Can be tedious/monotonous 2. Time allocation 3. Bandwidth intensity
- 1. Impersonal 2. CAC reader dependent 3. Lacks the personal experiences an instructor would provide.
- 1. Lack of student interaction/sharing to assist learning 2. Students sometimes lack discipline to sit and take an online course 3. Propensity for courses to be taken in one sitting regardless of time
- 1. Overload in information especially in doctrines 2. Target audience recognition 3. Presentation format and user friendliness
- 1. Repetition. 2. Buggy software
- 1. Ability to look in - connectivity 2. Too many courses to take
- 1. Not personal. 2. Problems with JKO and AKO. 3. No context
- 1. Inaccessibility from home due to cac enabled software. 2. Not working ever
- 1. Volume of users during the drill weekend slows the servers down 2. Some are

extremely long in time to complete 3. Using the search function doesn't populate if the use the name of the course instead of the course code

- 1. Scope - online courses going before rational training development (i.e. CBT to train sailors how to swab deck) 2. Learner - size, content, length - too long, too much bandwidth. Give exposure, that's it. 3. Disconnect between users/ supervisors and developers
- 1. Time, is there enough time, is this a priority? 2. Balancing content (is there too much content to retain) 3. General knowledge vs. learning processes
- 1. Access 2. Bandwidth
- 1. Irrelevant 2. Tedious 3. Inaccessible
- 1. Too many! No time or little time 2. Difficulty logging on, slow due to down bandwidth 3. Outdated/same (redundant)
- 1. Relevance. 2. Impersonal. 3. Outdated
- 1. Impersonal, does not connect to student 2. Too long and slow - lose attention of the student 3. Does not feel real, students feel being mandatory "check in the box" training does not connect them and wastes their time
- 1. Not enough time in workday. 2. Impersonal. 3. Too long
- 1. Online training = taking PPTs and putting them into a CBT 2. Online content is most effective when interactive. 3. Interactive = numerous quizzes.
- 1. Access connectivity 2. Access Connectivity 3. Access Connectivity
- 1. Access = CAC enabled doesn't allow work from home 2. Slow processing = waiting 20-30 seconds for next slide (sometimes longer)
- 1. Repetitive 2. Sometimes they're too long.
- 1. Most aren't challenging 2. Too much multiple choice 3. Redundant early training; easy to remember answer.
- 1. Poor "coms", crashes, no earphones provided, volume isn't working. 2. Little assistance is given in NOSCs
- 1. Not enough time to complete 2. Boring/repetitive information 3. No Interaction
- 1. Bandwidth. 2. Antiquated. 3. Repetitive
- 1. Not navigational user friendly 2. Site goes down or freezes on you 3. Information takes too long to load and trying to work from home or non-military computer is like pulling teeth
- 1. Connectivity 2. Site down issues
- 1. Technical - access 2. Repetitive 3. Assessments mostly require you to regulate information
- Keeping student engaged - interested - motivated
- 1. Lack of connection with real world scenarios. 2. No proper guidance. 3. No proper understanding
- 1. Technical difficulties 2. Training too long - need to have more building blocks rather than "take all" attitude 3. CAC-card dependence - disadvantage for reservists
- 1. Test questions do not change between iterations, allowing individuals to simply retake them. 2. It is easy for individuals to cheat in a number of ways. 3. Users can often lose interest taking in material that they already know
- 1. Knowing training availability. 2. Boring and impersonal. 3. Having the time vs. day to day work hours
- Coherent prioritization of all training/ learning requirements to include military training generic...service and joint... MOS specific
- 1. Restricted to CAC login
- 1. Too long. 2. More examples needed. 3. More reward or credit (need motivation)
- 1. Outdated. 2. Not related to job. 3. Tech

issues

- 1. Redundant .2. Impersonal. 3. Fluffed up with unnecessary issues
- 1. Redundancy. 2. Soft/hardware issues
- 1. Broadness of material. 2. Length of material being covered (HOURS). 3. Training intervals (annual)
- 1. Online training does not reflect real world utilization (doctrine vs. reality). 2. Training does not resonate with trainee. 3. Most people view it as necessary evil
- 1. Lack of immediate feedback when questions arise. 2. Some questions too basic
- 1. Only as useful as the person applying himself to it. 2. Still able to click through slides and muddle through test to pass
- 1. Lack of real world examples linked to joint training, techniques, procedures. 2. Training takes place outside regular work hours. 3. Redundant training
- 1. Too long. 2. Not relevant - needs to be more specific. 3. Inability to click through pages, must wait for speaker to stop talking before moving on and some people read faster than speech
- 1. Leadership looks at it as “additional duty” 2. Becomes a task to get a block checked-any way possible 3. Online learning or online certificate printing
- Ease of use - technology compatibility
- 1. Time consuming. 2. Long online course
- 1. Dry. 2. Access internet issues. 3. Length
- NOT enough time due to normal duties

In your experience, how effectively do online military courses encourage personnel to develop critical thinking skills? Can you provide a personal example?

- Not very effective. Critical thinking training needs to be in person instructor guided
- Everyone learns differently and often times online courses are simply a box to be checked. I feel training event utilizing “live” training (e.g. face to face, Skype, DCO, chat, etc.) is best and could complement a CBT.
- Somewhat effective. See 100.1 required application of theory
- They are not effective at this. Ever.

• Somewhat. This is best leveraged when there is a critical assessment that forces the member to think through a problem

• Not much. There is no one to borrow ideas/thoughts off of

• Some courses do. It depends on the type of information within the course.

• I have not seen an online or instructor LEAD course that has encouraged critical thinking

• Almost never. It takes memorization to pass the online courses unless writing is involved that is also instructor graded

• Don’t believe develop critical thinking skills. Increase knowledge and develop skills but encouragement comes from human interaction

• Rarely, because we are just trying to get through the training because we have to get it done on our personal time vs. time set aside during training to complete.

• Yes trafficking in person course makes you think about the criminal culture displayed in some countries in regards to human beings

• Critical thinking is utilized to get through the training faster

• I opine that online courses do not encourage critical thinking. It provides overviews on regulations, processes, and organizational structures

• Not at all

• They don’t because of how many we have to accomplish. Most people just click through wanting to get it done.

• Rarely do

• To get someone to think critically requires a degree of “buy in” by the student. If they don’t connect, or even deal well reading off a computer screen, the amount of critical thinking will suffer

• I don’t believe in online training based

• IMHO, critical thinking development requires true interactive events (not quizzes/tests). When online courses resemble online games then true learning will occur.

• Not effective, click through take test complete objective, constantly mandated to take B.S. courses instead of completing REAL MISSION

• The info assurance CBT is well done, although it hasn’t changed too much. Users actually “solve” problems. In contrast the JTF 101 CBTs generally involve answering “recall” type multiple choice

questions.

- None
- No
- Not as effective as most may think-most reservists rush through it and struggle with the courses that have no relation to what they are doing in country
- No, online courses do not offer ability to discuss questions or clarifications on points
- No. General military training is the same every year, very boring
- Online courses without hands-on demonstration and performance is not very effective.
- I believe if one takes the course seriously, it can be a great learning experience. For me I really enjoyed the new SERE 100 online course. The interaction really made me think
- Very ineffective
- Not much critical thinking...mostly due to wanting to finish course as quickly as possible
- I say they don’t. As an educator, I see more repetitive techniques.
- I do not see how they build critical thinking skills. Besides, online do not build critical thinking skills in most soldiers
- Extremely rarely. The military promotes obedience to doctrine and authority as a function of organizational culture. When I have challenged convention military thinking in the past, senior leaders who disagree but cannot justify their stance through thoughtful response resort to flouting rank as evidence of greater understanding and experience
- No. Critical thinking is more effective when in classroom/group training environment.
- Hard to do critical thinking without discussion
- Depends on how much the course is linked to a career advance or skill set. How the course directly impacts an individual career
- They are better suited for new or junior personnel who are still learning basics
- Not very much
- Don’t think elearning requires critical thinking. Written to be easily absorbed and thought about
- Rarely. Critical thinking is better fostered in a live, group, training session

- Doesn't like simple questions that are fact-checking...likes those that require thought and analysis
- Rarely. Unless there is a clear link the duties of the person taking the training
- Scenario based course such as the new IA courses and captivity course
- Not effective at all. Instructor led courses stimulate dialogue and further discussion. Critical thinking comes from different points of view, questioning, doctrines, values, believes
- Not often
- No. They are <*expletive deleted*>
- Very effectively, e.g. some of the topics of the online course I covered then at one of my officer's course but never really needed to apply it. During the e course, I had to cover the topic along, independent, and tested on it.
- Being newly assigned and taking my 1st course, I have learned what I don't know and that I need to develop critical thinking skills as they relate to this exercise
- limited because generally in person or f2f discussion would encourage critical thinking

If you could take a pre-test, and possible test-out of online course modules, would that change your opinion of, or motivation for, online learning? How so?

- NO
- To some degree yes however I "feel" our reliance on online/CBT training has decreased our knowledge base. One can take and pass a CBT without truly LEARNING the material.
- Yes. It would save valuable time if I already have the knowledge to pass the course
- Avoiding redundancy is always a good thing
- Not really with the way online testing works, knowing and reciting exact verbiage sometimes becomes the order of the day, vice showing understanding of key concepts
- No. I have always perceived something from any online course I have completed.
- Yes. If I know the material, I do not want to retake a course. If a pre-test reveals I do not know information, then I am willing to take it

- Yes. Several annual trainings have not changed for years. Most people find ways to circumvent the training to take the test.
- Yes if I could get out of the taking the complete test that would be great
- If available I would take a pre-test to test out.
- No. I personally learn more from pre and post but doesn't change my opinion
- Yes it allows me to get credit for training/experience that I already have and focuses on new things I need to learn
- Yes that would be nice to implement in a way that if you fail then you retake the full course
- Possibly, but this question does not address why course has been assigned or the scope of knowledge needed by the end
- I think this would provide effective use of time using experience and training to test out
- It allows you to see the most important areas of that activity and will allow you to focus on specifics
- Yes, save time
- Perhaps, would save valuable time if able to test out
- The sooner I can get that certificate the better
- Possibly, at least I would know the test isn't a total waste of my time
- Yes it gives me a chance to sit down on my own time and review material
- No because online learning shouldn't be about just learning concepts but of applying them in a distributed/collaborative environment. You can't test out of those distributed/collaborative experiences.
- No, again wasting my time, prevents me from focusing on mission
- Yes at some level, there's no incentive to "learn" anything since you need to go through each slide anyway. The AF CBT on ChemBio training does this well. If you score high enough on particular modules on the pretest, you do not have to process through those modules.
- Yes, I would probably be more motivated if I knew I could finish quickly.
- No
- Possibly if allowed
- Some, I wouldn't have to sit through information I already know
- Yes I only need to learn new material
- Yes, because it measures the fact that you have current knowledge and comprehension of the information and do not need to reinvent the wheel.
- No
- Yes, this would make it less time consuming so I would be less apt to put it off
- It would make it easier, people might be more motivated to get it done...specifically on subjects/courses that need to be taken every year or 18 months
- Yes, more time to work.
- Yes, I would have a different opinion because I would be measured by experience
- More favorable of the course because I would not have to waste time repeating material that I already know.
- Yes. Give an upfront perspective of current knowledge.
- Not really. Still takes time to complete
- Yes, it would motivate you to pre-read and understand the course
- Yes , then we can skip un-necessary courses
- YES majority of online courses are refresher training
- Yes. The ability to ensure member knows topics and not cover subjects repeatedly would prevent spending work time on training that may not be needed
- It would be for the better. I've taken some classes so many times I have the answers memorized
- Not really. Still need to spend time logging in and performing an online function.
- Saves time if little time is available
- Somewhat
- Yes. I've having completed the same KO training in 3 courses
- Yes. If you know the material, why sit through the whole course? Only review areas you did not grasp in pre-test before each section not overall lesson.
- No. What's the point of online learning if I'm not "learning"
- Sometimes, because it would reduce the time read if you knew the material.
- Yes - I would be much happier to do it
- Maybe. I feel that a need for a refresher is necessary especially when I don't prac-

tice the topic of that course.

- I don't see myself "testing out" but I see it as a useful tool for those who can (new guy)
- Yes I would not need to retake classes

If you could practice some operational tasks (like planning) collectively in an online simulation before a staff exercise, so you think that would be useful? Why or why not?

- Yes, provided the training was straight to the point
- Online simulation would be helpful however I think you NEED live interaction.
- Yes. If someone has no practical experience in this area, any training or practice would help them prepare.
- Yes, it would allow a team or individual see the products and process executed instead of just reading about it
- Yes because it could help find some faults. No, because I believe the Wargaming and human interaction is still critical with the invisibles.
- Yes. That would make theory more practical
- It would, however the coordination would be extremely complicated.
- Yes but time is always a problem
- Yes, maybe, it depends on how the simulation would be presented.
- A collaborative environment would be useful, due to the collective collaboration
- Possibly. As it would give me some type of expectation of the process, but may be problematic as it forms preconceived notion barriers as to how it should VS how it does work
- Yes so when the exercise actually starts you already know the battle rhythm and natural flow for the exercise
- Possibly - If it is all the same program, terms, flow, rhythm etc. as the exercises. Then I believe this would be productive. What we learn first we learn best if we learn wrong the retraining is extensive
- Yes. PMESII and JIPOE aren't practiced regularly to help hone skills and see the process JOPP, CAP
- Yes-practice became second nature
- No. It would simply add hours of useless briefs, discussions and planning to

prepare for the "practice", furthermore, exercises are practice in themselves. Practicing for an exercise is practicing for practice

- Yes, I do like the idea of putting something in practice. But also would be dependent on the time frame
- In theory yes, but in practice it hasn't worked
- Possibly. It would have to be well coordinated and during a training stand-down day. Leadership would have to allow time during working to break from normal duty.
- Yes more time, training
- Yes! Not only useful but should be mandatory! Regular online simulations should be part of all career development (cross-service).
- No - actual face to face, hands on training can not be substituted by on-line training
- Yes this would address a higher level of learning than just recall.
- Yes, so you could see the bigger picture.
- Yes, you learn more
- Yes, interaction would foster better learning
- Yes just as a refresher
- Yes! I love simulation; it's the next best thing to face to face instruction.
- Absolutely - a virtual training would help get the online training in one's mind before attending an exercise
- It would only be useful if it was as streamlined as possible so as to not take up too much time
- Not sure
- Perhaps. It should include participation from all parties in order to make it effective
- I would think that online would be helpful if there was continuing access through AKO without CAC
- No. with a number of other real world responsibilities (unless isolated in a training environment) individuals simply would not devote the necessary time or attention to a simulation to make it effective training tool
- No, don't have the time
- For a limited # of skill sets/functions
- Yes. It would give you an opportunity to determine weak and strong areas collectively and who you can go to for help in your weak areas
- Yes. But would need to be less than 3 hours and have good participation. For a METOC officer there normally is little training that METOC can participate in
- Could be....all situational dependent
- Yes. Productive, practical, set your mind-set up
- Yes. Practice is always helpful when learning
- No. Because there are too many opinions about how it's supposed to happen
- No. Planning simulation would be best accomplished in a live, group setting
- Maybe. Prefer F2F
- Yes, if led by a real person
- Not sure. Think it might be specific enough for particular EX and not take too much time
- YES! I would love to practice being a planner. Learn better by "doing"
- Yes it would help understand the big picture.
- No - It would destroy the joint process - collaboration in person is irreplaceable
- Yes if you are not a planner practicing will help understand
- Yes, any pre-training is useful if you have the time. Training points out your weaknesses and better prepares you for the exercise if you are already familiar with policy and procedures
- No It would be useful but I don't think I would have the necessary time to devote to that task

Any other comments about military online courses or recommendations for improving them?

- My experience with JKO has been extremely frustrating! I have wasted much valuable time on "required" training courses due to failure of the website. Time in the military is very valuable, and there is none to waste. However, I have wasted many hours on the JKO course in the hope that they will eventually work the way they are supposed to!
- USN said I have difficulty completing many courses due to high software requirements. Example: Most still operate IE 6.0 and minimal flash capabilities and limited bandwidth. A local uploaded version could enhance ability to complete more online courses.

- If you put in a time limit (i.e. 1 hour for course, 10 min for exam) on online courses, it helps to simulate a traditional environment for those not accustomed to online learning.
- In general military training is considered a waste of time as its priority on scale w/ working hours is terrible. Which is a cultural issue, however innovative, interactive, relatable, relevant training especially in their environment of the target audience would be far more effective.
- Great way to gain knowledge, but not a replacement for collaborative learning in an interpersonal environment “book learning” vs. “OJT”
- If possible if you can shorten some of the long courses
- 1. Remember CBT is a supplement to produce an asset. Ask where most intensive training should occur. Example hands on, CBT, class etc. 2. Keep scope. Don’t make me do a 4 hour course online for something I will be doing for 8 hours the next day. 3. Reduce redundancy.
- Continue with current examples, best practices and pitfalls to keep training/ course material relevant and effective
- Checklist should be created to keep as a reminder.
- Eliminate them
- Need less, not more
- More than 30 min at a time is too much. Classroom discussion is easier to follow and stay engaged. I can follow my college profs for 1.5 at a time, but CBTs lose me after 30 min
- Social networking games are a model for online simulations. Not only will individual learning occur but organizational learning/evolution can occur. Look at disease research done from the WoW (World of Warcraft) disease/enchantment outbreak as a model.
- GET RID OF IT! Promote classroom practical field training. Get rid of the idiot box computers!
- Give more bandwidth, more storage space, more time
- Add more simulation exercise and cut out all of the end of module tests and final assessment tests “simulation is more effective than fear of failing tests”
- Keep up the good work
- Test-out options would be great
- While online courses are currently dissemination platforms, including a function for discourse (chat/forums) could go greater lengths to engage users and expanding learning opportunities
- Model of progressive/as you go validation is better than “test at the end” method. Former seems to be better received and more effective.
- NO
- Scenarios where you choose answer from choices helps to relate material to what you read and helps to reinforce. Having to obtain 100% on tests is frustrating and only causes person to start guessing or process of eliminate just to get through. ***Anyone being assigned to Joint Comm should be given a list of courses they should complete prior to reporting just like GSA assignment, however someone should check for course completion (unlike GSA)
- YES. Quit believing that online learning is the panacea for learning. Online learning courses should last no more than 1 hour. Any longer than that and it bites into my work day....keeps me from researching questions I may have and bores me.
- Somehow make them more interesting they are a little dry

Post-CoL Reactions Survey (Experimental Group Only)

In your opinion, what were the least important topics covered in the online course?

- In my opinion, Lesson 2, slides 12-14 were of limited value due to the loose framing of the scenario. The recommended responses had little to nothing to do with the focus of the rest of the course and therefore simply interrupted the flow of the course material.
- The lessons were time consuming. The test was challenging
- All topics were helpful
- Don’t know...all seemed relevant
- The course should define exactly what is or is not important.
- Linear approach
- None

- None noted
- JSOPP
- JOPES
- May have been desperation to finish module, but Lesson 7
- Strategic thinking
- I thought that all subjects and topics discussed were important to my education to be an educated member of the staff.
- Crisis Action Planning
- OPEN
- Operational Art
- This survey.
- Operational Design
- Lesson 4: Joint Operations Planning Process Deliberate Planning Contingency Plans, it was covered in too much depth and took too long to complete.
- JOPP - An important but very familiar topic.
- All seemed relevant

In your opinion, what were the most important topics covered in the online course?

- The JOPP and the need to understand it in order to play well in the Joint sandbox.
- COA, APEX, IPR, Crisis Action Planning, EXORD, OPLAN, OPORD.
- In my opinion all, since they were all new to me.
- All the topics were important
- All of them.
- APEX, CAP
- This was a good overview of the planning process.
- Initial planning
- CRISIS ACTION PLANNING
- I couldn’t tell from the course. I didn’t feel that anything was emphasized more than anything else. This leads me to say that the most important topics were the ones the questions were about.
- Structure of org

- Roles of Commanders and Staff
- Joint Planning Process
- Joint ops approach
- Planning process
- APEX
- All of it.
- Joint operations planning
- APEX
- JOPP (Lesson 4)
- Interaction
- Detailed description and teaching of the Joint Operational Planning Process
- Operational Art and Operational Design
- OPEN
- Joint Planning process details and Orders
- CAP, APEX. Too much info.
- Differences between APEX and JOPES.
- All of it.
- JOPES and APEX
- Planning process
- Planning
- All
- APEX and its role in planning.
- APEX - it is fairly new and it is important to train staff officers on it.
- The flow of the planning process

Please describe any technical difficulties you experienced while completing the online course

- The multiple pop-ups do provide one more window to have to navigate to and from, but otherwise, no comments.
- Technical difficulties - none.
- I started on this course over a month ago-got off track and am now rushing to finish the course. I thought the program would have done a better job in saving my course progress so that I would not have to start over and over again.
- MINOR DELAYS AND HAD SYSTEM DELETE OR HID TWO EVALS LIKE THIS ONE.
- Slow transition to next page.
- Timed out twice when I had to go do other things.
- Worthless
- Couldn't access JKO on Internet Explorer from home. Had to use Internet

- Explorer here.
- Had to reload browser several times, the browser also froze and required me to close out and log back in.
- AT TIMES THE PROGRAM WOULD NOT LET ME PROCEED TO THE NEXT LESSON
- Sometimes the internet was too slow.
- On Module 5, Lesson 4, I would suggest that when answering the 6 test questions, the text inside should be auto highlighted in order to allow the user to delete the text conveniently and easily.
- Internet web site had many freezes.
- Kept having to go through slides again when the link did not take you to the next level.
- Site when down occasionally
- In the Formatted Assessment starting with slide 37 the answers for question 5 & 6 are the same
- At one point in Lesson 3, I clicked next lesson and I went from approximately page 25 back to page 2. The only way to get back was to manually click forward through each page.
- When you select closed caption, the pop up box covers part of the lesson and sometimes a picture or graphic that you need to view while reading the CC box.
- None significant
- As a reservist with JKO now requiring a government network I can no longer work from home on the course this extended the completion time by at least a week.
- The vignette took 5-10 minutes to start playing, and then froze after a minute or two of playback. Took another few minutes to restart.

Any other comments about this online course or recommendations for improvement?

- Lesson 1: Overview of the Joint Operations Planning Process had a graphic which spatially represented the Operational above the Theater-Strategic level of war. It may be small potatoes, but for visual learners who are less familiar with the material, it may lead them to initially believe that the representation is correct until the text and audio kick in, forcing them to un-learn the arrangement represented by the graphic.
- Having to get 100% on test was frustrat-
- ing and made me just start guessing answers to get through the test.
- A lot of the terminology is complex and the courses should be prepared keeping in mind that not all members have the same education, thus the aforementioned. Topics are good but one must keep that all ranks may be assigned to the exercise and must complete training, so it should be prepare or broken with a simpler vocabulary. Keep in mind your audience, it is not always going to be the more educated people.
- Make it shorter
- Overall I found the course to be challenging because it was detailed information about the topic. I became very informed about the concepts involved but will need to engage in the processes over time to truly digest the details of the process.
- Redo it
- Take it off the internet and have an experienced planner teach it to beginners in a SOUTHCOM classroom.
- This module is way too long. Not only are lessons with 30+ slides discouraging, but they all included "rollover" and "click here" portions that added to the overall content. By the time I reached the Post-Assessment, all that information had begun to muddle.
- Dislike that if one of the mouse-over/ click for more info is missed that you can't move on to next topic. Had to take Lesson 4 twice because of this. Too much info for one course, and it took way more time than the estimate.
- Break up the topics into shorter segments, not exceeding more than 20+ slides, with small quizzes to test student comprehension and emphasize key learning points. After 20+ slides, student attention span is diminished and learning reaches a diminishing point of return.
- This survey is too long.
- CONSOLIDATE SURVEYS WHEN TAKEN MORE THAN ONE COURSE. TOO MUCH TIME IS BEING WASTED REPLYING TO EACH.
- Make it go away
- This training wasted a lot of valuable time.
- I attended the two-week JECC Planners course recently. I have worked in a Joint environment since 1987. SCJ15 Operations has been extremely busy with real-world Joint Manning Document Sourc-

ing. Our Section has been undermanned with individuals in our section TDY or on leave.

- Shorten into two different modules.
- This particular module had too much information and should be broken into two modules

How effectively did the online course encourage you to develop critical thinking skills? How so?

- No change.
- Effective by painting the bigger and whole picture.
- It encourages more than the normal for me, to the point that it was annoying me because a lot of the terms, vocabulary and acronyms I did not know and had to look them up.
- Very much
- Not at all, the class is boring which makes it difficult to follow.
- Minimally
- Very effective
- SOMEWHAT, BY THINKING AND DETERMINING WHAT TASKS NEEDED TO BE ACCOMPLISHED IN

ORDER FOR THE PROCESS TO CONTINUE TOWARD COMPLETION.

- Memorization - yes; critical thinking - no.
- Not very effectively, this was more an understanding of the workflow involved in the planning process than any actual critical thinking skills.
- Not too much
- No so much.
- Slightly
- None
- It didn't. I was simply attempting to digest the concepts of the process.
- This is crap
- Not very effectively.
- Not very effectively, it was mainly clicking through PowerPoint style lessons and hoping that short-term memory would last until the Post-Test
- Not effective.
- Medium
- Not very effective
- Online “learning” is not conducive to critical thinking.
- I will have to put them into actual situations to honestly answer the question.
- VERY
- Did not give real world examples with clearly linked planning info.
- Not at all. Critical thinking is not memorization. These courses do not require critical thought. Check the definition of critical thought.
- It did not.
- Not much
- Effectively
- Moderately. The lessons were very long and the overall module was extremely long. It was difficult to stay focused.
- Well
- Very effective
- Marginally, the course could apply JOPP more to real world campaigns and problems.
- This is more about learning the topic than thinking critically. That will only happen during actual use of the planning processes.
- Somewhat effective

Post-Academics Reactions Survey (Experimental Group)

Did the online courses help you get more out of the Academics? If yes, can you provide an example? If no, what would have made the courses more useful?

- Yes. The online courses focus more in understanding the “how” of joint inter-organizational/multinational relationship and common effort
- Yes, it was a good overall review
- Yes, mostly vocab
- Yes, I was more familiar with some key terms and concepts than I would have otherwise been
- Yes - courses provide examples and more depth to the topics
- Yes. Mention of APEX planning system was new information that I should have

been covered in academics

- Provided me with terminology used during academics
- I did not attend academics, with exception of academics conducted 12 July
- NO. More useful if practice exercise event...for instance. Establish a joint targeting working group and show everyone at least what it looks like
- Online courses very MACRO. With examples by not focus on strategic or theater TTP
- YES. Prepared the analysts mindset with useful knowledge to better collect and understand info
- YES. To better understand the planning process
- No changes
- Use more “lessons learned” and examples than doctrine
- More details on TFFDD planning and plans management board?? And 7 minute drill. Use of other COCOM best practices and examples
- More specific scenarios to CCDR AOR so you can see how the lesson “basics” fits into real world scenarios. Have a link to each COCOM so users can choose relevant one.
- One course was very very painful and not very useful. At least one course did not have practical applications / lessons to apply real world scenarios.
- Would change the length. No more than 1 hour to complete. Keep it short
- Include some of the academics in the online training
- All CBT should include walkthroughs or examples that assist with real-world experiences
- Length of course. E-course was time

If you could improve one or two aspects of online training, so that it better prepared staff for exercises like PANAMAX and related operational duties, what would you change and why?

consuming. Almost 3 days to complete. Very informative though and helped me better understand planning.

Any other comments about the pre-PANAMAX online courses or

Post-Academics Reactions Survey (Control Group)

In your personal experience, how well-prepared are the other individual staff members when they arrive at the Academics? For instance, are some of them rusty? Do they know the current doctrine?

- Yes rusty or nonexistent online is not the answer
- Difficult to tell at this point. Will know more as exercise goes on
- Some show up with their tools sharpened while others benefit greatly from the academics COIs
- That seemed knowledgeable.
- Everyone was rusty because we received <expletive deleted> information about what we needed to train on prior to arrival
- Some are well prepared
- If anything the academics is a refresher
- They are usually well informed
- Well prepared
- Have to baseline due to varied backgrounds. Some are busy because they are civilians for 50 weeks a year but ramp up quickly
- Not always
- I think the staff are prepared in a rough manner and are waiting to find out how to apply what they know to become more honed
- The academics were presented to the audience. Interactive lectures would not work in a large group. There was also a concerted effort to respect the Multi nation audience and not focus on US only. Small teams (intel) were less formal and more participatory

eLearning on Joint Knowledge Online, in general?

- Would have been better if put out earlier for understanding prior to exercise RTC planning. Obviously this won't be a problem for next year :)

- Lessons ought to incorporate "plan review" lessons from past on similar missions. Those would be more valuable to theater planners.

- Where was the SOUTHCOM participation for it?

- Both, it depends on the background.
- Often. Academics don't match the audience. Today for example.
- NO, but that's expected, first few days are always OJT
- I think most officers do, enlisted not so much/some
- We are all rusty because it is not a part of our daily routine (for the most part). As long as no coherent joint strategy of method of regular exposure to joint doctrine exist this will be the case.
- Varies with experience levels, attitudes, preferences
- Academics were all "generalized" - very little training and PMX. This made everyone "rusty".
- This is my first academics
- Those who completed the online training were aggravated they had to sit through a lot of the same lectures
- Most seem to understand
- They have had some past job assignments that allowed them to understand some of the information and reason for the exercise, as a first timer I did not
- I believe most are rusty but with practice will be ready for exercises
- I think most US staff are well prepared
- Overall prepared enough. Mostly through work/personal experience but maybe a little rusty on current doctrine
- Senior personnel know their stuff. Mid level personnel like me don't have that advantage.
- It is hard to tell because there is no real discussion, but they often forsake basic doctrine in daily life. Consider pretesting to opt out
- Depends on seniority and level of joint exp. Varies widely, even at comm staff
- Very well
- Of course they are - send everyone to MSUC if everyone should be on the same page. Many have no experience

on a staff, so the ability to work together takes some time

- Somewhat "rusty" but individuals will be ready for the EX

In your personal experience, is there discrepancy among trainees' knowledge and skill levels prior to the academics? If so, how significant are the differences? Do these differences impact the exercise?

- Yes huge individuals learn differently so it is ridiculous to think CBTs are the answer
- Yes, very wide range of knowledge and experience impacts the exercise in that they require more training time
- No one I have experienced
- Yes, there are discrepancies. I do not know yet how they would impact because we did not start yet
- Yes, but it all depends and varies.
- I feel that the SMEs knew the material, the issue I find is their limited ability to express themselves to a mixed and general audience
- There may be some insignificant differences
- Yes, but not significant, they have little or no impact
- Differences in knowledge and skill levels but not significant enough to negatively impact exercise... start up current is expected
- Yes can speed slow or inhibit the training
- It may not be effective to brief/train O-6 down to E-4 level. Also many of the partner nations have unknown skills. The language barrier is formidable to effectively use all personnel
- Yes, depends on previous experience, it's enough to carry the exercise but training checklist for your area (role) will assist with expediting training
- Yes, we have people receiving training

who will next be performing functions???

- Yes but that's why it is an exercise
- Academics will usually only reawaken knowledge already learned rather than instill new knowledge. It's a refresher not a true academic course.
- Yes, not very, not very
- This is my first academics
- No, we are always learning
- No but there is lack of understanding how to bring it all together in a joint environment
- No, we are always learning
- I don't think there are significant differences
- Yes, highly different impacts exercise mostly if staff is not interested in learning process
- Yes. There are substantial diffs (comparable to diffs between HS grads and PhDs) which significantly impacts exercises by isolating some members while others focus on nuance that is irrelevant to the group
- Yes, minimally, yes
- NO

In your personal experience, how well aligned are pre-existing activities (e.g. academics or staff exercise) to the collective exercise? For instance, do the pre-exercise training and education activities support the collective event's training objectives? Do the activities intentionally build on one another?

- Intent makes sense and is helpful however access (system down, CAC issues, etc.) cause too many issues and I think it's not the best platform to use solely
- They seemed to build
- The academics and staff exercises are vague and generic, and mostly oriented towards the planners. I felt as though my presence was mostly unnecessary.
- Very well aligned. COIs are structured to go from general concepts to specific tasks
- I believe the studied process to prepare us was sufficient.
- Not aligned at all
- This go-around things seemed to be bet-

ter prepared and aligned

- The pre-training feels pointless when the morning academics completely reiterate the pre-training. I am learning nothing new so my attention is not fully provided.
- Usually very well
- Well-aligned support. Yes, they seem to build on each other
- Yes/Yes
- No not always
- I believe the pipeline is well planned
- Good timing, exposure and task density for activities. The only change is to build an event (2 days) to write, brief, and release orders
- Yes
- Not aligned or tailored to audience
- Too broad of a question, basic answer YES
- They support the objective, but are not useful as they could be. Not valuable/efficient use of time
- Pre-ex academics help bring everyone to a common baseline. However more time should be taken to provide detailed CC guidance/direction on Conops given that the originators of those Conops are available. OPORD brief, CC intent/mission brief
- We'll see
- Hard to tell
- This is my first academics
- Not fully
- Not very well because all training and on-line CBTs normally happen at your own duty station and not with other service or in a joint environment
- I believe they have come a long way and will continue to expand/improve over time
- I think they are well aligned and do build on each other
- They want to achieve training objectives (not always will happen)
- Pre-EX training is a waste of man hours and resources...few participate in the mandatory training and fewer absorb any INFO. May be better if SMEs taught courses.
- Could be better tailored to various seniority and skills sets (more focused on specific areas to enhance command/directorate training objectives)

• Not well aligned. There was no "road to crisis" or pre assigned anything for Haiti. No detailed materials and web maps of everything weeks in advance. Business as usual until "<expletive deleted>... Haiti is underwater!" The products provided don't mimic the products used day-to-day and lead us to rely on docs and procedures that are not available if this contingency would happen in real life.

- No prior experience to drawn upon
- Yes - the planning process is great for those who are able to attend
- Pre exercise training was limited

If individual online courses could be tailored to specifically support pre-training before training events such as academics, would that be helpful? Why or why not?

- Yes needs to be supplemented w/ live feedback/input
- Only if it were truly "tailored" to each person's specific mission
- Yes. Building them to fit the supported exercise would streamline the academics in support of the exercise start
- I believe it could help and shorten the academic training sessions.
- It would enable the service members to see the entire picture of an operation - and possibly contribute to the concept as "we train to fight!"
- Yes, any tailored training would assist in better preparing
- Yes, as long as they are both aligned to be in concert with each other to build one's knowledge, as of now it is just repetitive, and therefore counter productive
- Yes that would save time and fill individual
- Yes
- Yes, reduce start up currency
- Maybe
- Yes but the scope is important
- None come to mind
- Yes, as long as it translates into something the member could keep (checklist)
- Yes - reinforcement. Maybe have online training days after academics as reminder and refresher. USE online courses as "prep"
- Yes

- Brief overviews on concepts that apply to your function
- I don't like or believe in online training
- Yes if specific individual capabilities are required they should be communicated ahead of time.
- No! Because of the issues of access, connectivity, passwords, time, the entire automated experience has been negative.
- Yes-move from "theory" to application
- I think it would, so you would have a better understanding of your responsibility
- Online classes were too long, and if you had to stop in the middle and restart days later, you had to go back through material to pass the test at the end of the lesson
- Yes tech skills require tech training, basic skill - basic training
- Yes because it makes it more meaningful and you actually get credit and recognized for having specialized training and it won't be looked at as just another online CBT or requirement for deployment.
- Absolutely
- I believe it would be helpful to tailor the training to specific functional areas. Not all participants need to learn joint fires panning or joint targeting, etc.
- Not really. Unless it uses past exercises as framework example
- NO. eLearning does not address systemic problems within the military's psychology. Tailoring courses would simply become another obstacle to completing an exercise.
- Yes. Allow focus on specific functions/warfare areas
- Yes. You could learn about what you were actually going to be doing.

- Not helpful. We're not standing the "BML" we're trying to stop them, up to kinetic force
- Yes. Focus on relevant topics might help individuals care more and not just check the block (box)
- No

If implemented, what topics should online pre-exercise courses focus on?

- Language, culture, maybe setup for learning doctrine items in different formats (e.g. crosswords, matching etc.). This engages the student at different levels.
- Products (general) that would have to be produced during the exercise
- Depending on your function, provide additional online pre-exercise courses. i.e. I'm assigned to C4/J4 as a Logistics Planner, as such training in Joint Logistics & op planning would help
- Command structure, communications, basically just what it is now, just better presented
- The current array of courses serves well
- Joint Training (Doctrine)
- Depends on the exercise scenario. Participants, area of operations, resources/support, interagency, IGO, multi-national
- Focus on concepts, terms, "who is who in the zoo," what's the op flow chart, flow of support to end result. Train the specifics onsite
- Information flow of exercises
- Culturally based and focused on the participating nations. Also some info on their uniform and ranks. How can we
- salute if we don't know their ranks and recognize?
- Overall objectives. Short training sessions. The long and many modules were too much
- Joint Pubs (JP-3-33 and JP-2-01)
- Interactive planning and execution exercises!
- No on-line courses please stop the insanity
- PMX-related courses (tailored)
- They should be tailored to your specific role.
- Job specific
- Because of "globalization" it should all focus on language barriers of different services when it comes to a joint effort/training/ and performance.
- Each specific Jos in a JTF
- Specific functional area courses
- Be MORE interactive in decision-making , info sharing and processes to get CDR approval on actions to be taken.
- Focus on task at hand, that will give you the information you need
- Background info specific to the training scenario, not doctrinal courses that individuals should already know or for which info is readily accessible
- Joint/Combined best practices for processes in specific functional areas
- A way to effectively focus on using current products to support the exercise is made up documents we see once a year.
- No experience to draw upon to provide recommendations
- Topic specific to the exercise

Post-Exercise Reactions Survey (Experimental Group)

What activities did you complete as part of the PANAMAX pre-exercise work-up?

- JTF
- Online courses, staff check-ins
- Academics, online courses

- Online courses
- PMX12 academics, online course
- None, I jumped from J34 ROE working group/J34 mission assurance WG to real world. Throughout the entirety of PANAMAX
- I completed all online courses required for PANAMAX. I was involved with coordination targeting, CAP, STAFFEX and planning J35 FOUPS activities
- JKO courses, Coliseum and DCO were helpful
- Academics, online classes
- Academic Beta online course
- Academics, online courses
- Online training and web portal
- Online courses only
- Online courses only
- Online courses as well as some classroom course
- J63 OPS cell
- Joint operations planning, interorganizational/multinational coordination, and interorganization coordination

- Academics, online course
- No, total surprise when I got here
- Vcat and the three JKO courses
- Online courses, JKO, and Southcom, and terminology
- Staff Ex for two days and computer hard road to crisis
- Online courses
- PANAMAX Academics, Participated on Ex CAP CONOPS TNG, Participated on Planning Conferences JKO courses
- JKO
- Online courses, PANAMAX 101, training in CAT
- No prep other than online courses and short academics session. Daily duty performance prepared me more than other issues.
- PANAMAX pre-exercise training
- Academics, pre-crisis deliberate planning, CAP, online courses
- Academics, online courses, and internal IO staff preparation
- Academics, staff ex, and online courses
- I did the CoL JIEDDO & JFC 200 courses and I did the SOUTHCOM J777 pre-PANAMAX online training regarding the Road to Crisis
- All required online courses
- Academics and online courses

Were these activities valuable; why or why not?

- Yes, because I learn new acronyms and who is in charge of certain forces and assets
- Not the online courses, but the check in was vital to accountability of personnel.
- No, I had prior training in the joint planning process and many others during PMX12 seem not to have conducted training.
- No, I honestly cannot discern a correlation between the courses and PANAMAX.
- Yes, good run-down of interagency processes needed to be oriented more to job specific for the actual end user
- Yes for the MNFS
- Yes the academics and CAP were helpful in preparing the J35 to plan for crisis action OPTs and coordinate with our components

- The JKO course didn't really help. The DCO and Coliseum training were essential
- Neither were specific to the actual exercise
- Review- refresher help remind me of joint operational concepts but did not have a major impact during PMX12 (I'm not in J3 or J5 or J9)
- Yes, needed more depth on applications available and how to use (APAN)
- Yes somewhat-role training preferred
- Not a big fan of online learning
- Yes
- The classroom course more related to my function during PANAMAX
- No didn't do anything
- Yes I learned more about what goes on during the entire planning and execution of multi-national forces mission/exercises
- Yes, help me to better understand the exercise and other players role
- No, took way too long and the vocabulary just merged
- Vcat was ok if I were deploying to the area but not for the CAC
- Somewhat
- Yes, save situational awareness of the operation and enemy situation as well as provided guidance on the tools available for C2 coordination
- Yes- re-familiarize myself with the terminology
- Yes, kept me focused on exercise objects.
- My position didn't require coordination
- Some regarding CAT processes and expectations
- Yes, but not nearly as valuable as they could have been. The training would have been far more valuable if it included SPECIFICS - especially organizational structure for the exercise
- Valuable as it pertains to purpose and situational awareness
- Yes, helped get my head in the game
- Yes, preparing me for the exercise minimized last minute information gaps and scrambling
- Yes, set the framework
- I have attended the former JFCOM JECC course so I have been through the whole MOMP process, so I didn't get much

from the JFC 100 & 200 courses. Also, I need to be familiar with the MOMP as the Chief of Exercises but I don't practice it on a daily basis

- Yes, new concepts and detailed information in regards to the overall exercise were covered.
- Yes, the activities were valuable. However, they only provided a taste of what to expect

What different and/or additional pre-exercise activities would you recommend?

- Shorter version
- Maybe courses that actually bear meaning to my lowly, insignificant paygrade.
- Staff training to better orient staff to capabilities in other branches.
- Cdiserm and DCE training is the only requirement I could see necessary for PANAMAX
- Job specific training per position and J code, and CAC relationship with other entities within southcom alone.
- No
- For those not in planning billets, please make sure those individuals attend JECC-PC in Suffolk, especially those attending OPTs for PANAMAX
- Online courses tied into PANAMAX
- Having AARs from previous years and lessons learned
- JPOE and CPOE, mission analysis and center of gravity presentation on CBT would be useful for next exercise
- Review of the many venues/application of how information is passed to and from COCOM/interagency/MNFS/Components
- Role simulation
- Live coursework
- One day to go over PANAMAX structure, OPORP, etc. I was too busy with my normal work load to prep for PANAMAX until it kicks off
- None
- Annual online refresher training
- None-online. Classroom day or 1/2 day on what you want
- A good portion of this is OJT, but classroom training may help on the subjects
- Don't know

- Specific training or to the different functions within the CAT and what it brings to the table
- Review of command structure for PANAMAX
- More in depth command and control relations as well as current operations processes and procedures
- PANAMAX 101
- Nothing comes to mind
- Practical tools for running key B2C2W-GS (e.g., FUPLANS, JPG vs. FUOPS, PMB, etc.)
- More reality-based instruction on coordinating with other services, organizations, and multinational forces
- No additional activities
- None
- Participation in all planning conferences to understand better the intent, objectives, and everything else in regards to the exercise from the beginning stage. Also to improve network/interaction
- I would like to see rehearsals and products

Did the online courses help you with your duties during PANAMAX? If yes, can you provide an example? If no, what would have made the courses more useful?

- No. The courses had nothing to do with me. It all seemed geared to the “upper-crust”. Gear some info to the lower pay-grades.
- No, courses provided no additional information to individuals with formal planned training.
- No, they did not pertain to any of my personal duties.
- Yes. Discussed organizational structure, processes and planning, good for overall knowledge, not for intel duties.
- None
- No, the courses were not helpful for those involved in daily planning activities
- No, I couldn't link the learning to PANAMAX
- Not really- hard to remember all the acronyms
- No
- No not really involved in planning at night. It was more interagency and multi-

- national force coordination
- Break it down to smaller parts (Mind absorption)
- Yes, in terms of understanding the lingo
- No we ended up not using any of the systems that were taught online. We used white boarded concepts and PowerPoint
- No, I am unsure of and/or cannot think of a use for the information in the courses relation to my duty position
- Would've been more useful if CoL covered my job responsibilities
- No, most of my duties and responsibilities were completed prior to the exercise
- No, but it help me understand the roles and duties of other players
- No. Finding the courses was a needle in a hay stack. Not user friendly-think apple/mac.
- No, the courses were too long and the subject matter was too similar allowing it to jumble together
- I'm not sure it helped. I'm relatively new to PANAMAX, so everything seemed new. Can not give you a good enough response
- Not a great deal, but primarily because I'm always familiar with the major process used in Joint planning and inter-agency/multinational coordination
- Yes
- Yes and no
- No, my duties as J8 battle staff entail no Joint planning
- No - not much involvement by J8 needed in CAT
- Not really
- Yes, provided a baseline for planning vocabulary, processes and pitfalls
- They were a good refresher
- No, I run/aid/contribute to the White Cell, so I'm not part of the training audience
- Yes, especially with acronyms
- Would have. I was pulled out of PANAMAX prior to Start Ex

If you could improve one or two aspects of online training, so that it better prepared staff for exercises like PANAMAX and related operational duties, what would you change and why?

- I just hated those courses. Pretty much everything about them.
- Require all staff elements to take training and include capability of various staff elements.
- The wording of the questions/courses was not comprehensible and did not make much sense.
- None.
- None
- Make the training more related to PANAMAX, include other terminology used in PANAMAX to the training.
- Review lessons learned from previous exercises
- Make these efforts more applicable across the J-codes
- Have a module with an intel focus
- Role play
- The coursework was very detailed. Please put some more rigor into showing the big picture
- I am unsure as to the intent of the training as it was not part of my duty responsibilities, during the exercise, to coordinate at that level
- None of the officers with key roles in my shop wanted to do the training. I think it should be mandatory training for all key leaders involved in planning and execution of joint exercises
- It is a bandwidth heavy and did not work from hotel connection. Missing the why a lot of similarly sounding “stuff” and no relevance to me.... The planner
- Shorten them and separate some of the subjects. Classroom courses while here would be good also.
- Length of course, felt like a master level class that required too much reading and writing
- I recommend a focus on process training. Establish how can we process information flow and intro USSouthcom functional area to process the information
- Tell us the publications from which to draw the information so we can refer to the pubs
- Provide specific to scenario subjects and situations
- COP courses were too long. It became a matter of completion instead of learning
- The planning course put me to sleep - too long too boring - not very applicable (in my limited experience)

- Nothing comes to mind
- Include online-communication training (DCO, chat, etc.) Many minutes and hours wasted due to peoples' inability to operate their computers effectively
- The length of the training. The JKO portion took a day, Academics was 2 days. Would have been nice to have a schedule prior to the requirements, i.e., 3 months out so we could block the time
- I would include a module with a pre-execution checklist and requirements in an effort to improve daily duties and communication channels
- Am at a loss on this one. In my case, on-

line training is more accurately “online reading” and online reading, like any reading, is more familiarization than training

Any other comments about the pre-PANAMAX online courses or eLearning on Joint Knowledge Online, in general?

- Enough said.
- None, good initiative
- Need a pre PANAMAX list of requirements. I hate surprises did not know until I arrived even then, had to get a print out and a slide to know what needed to

complete.

- Online courses were not beneficial to me due to the role I play during PANAMAX. But I would surely recommend them for those that do (primarily senior leadership).
- No
- Liked taking the test up front to obtain credit for what you already know
- The pre-briefed “expected time to complete” the JFC courses was way off what it actually took. I think if you include the log on and surveys, then each course took about 2 hours each.
- No

Post-Exercise Reactions Survey (Control Group)

What activities did you complete as part of the PANAMAX pre-exercise work-up?

- JTF-101 Computer Based Training
- None- came from JECC
- Online courses
- Joint online JTF 101, joint online human rights and SERE 101.4
- The courses at the bottom of the list.
- Marine net i4 courses
- None
- Primary Professional Military Education Blocks I-4, information assurance, PII, NWC naval logistics integration, NWC COA CONOP
- Online courses
- Only one executive level targeting course, however, I am not filling that duty position. I would point out I was manifested on the JMD the week before the exercise.
- Online courses
- JTF 101, SERE level A
- All of them, JTF and NKO
- None
- JKO courses, PANAMAX video/courses
- Academics and online course
- Academics
- Online academics CBT'S and warm-up DCO sessions hosted by my J-4 plans

section.

- None
- Staff- Ex, academics (online course)
- The PANAMAX training provided on the portal address the load to PANAMAX, FDO, OPSEC, use of APAV, registration, etc.
- Academics, CAP, Staff-Ex, online CBT
- Partial online JKO course, also prior PANAMAX experience

viable.

- They may be valuable, but once the course is completed, everything was just learned and forgotten.
- Yes, they were helpful since this was my first time here.
- Yes, it helped prepare me for the exercise
- Not so much at my level. It made it a little easier to understand how information at higher levels flow, but no so much at the A0 level.
- Yes- it helped me understand common relationships and responsibilities
- Yes staffEx was helpful as a warm up to address issues ahead of time and to get to know our counterparts in the organization playing in the exercise.
- Yes good SA
- Yes, as a reserve officer I need the train up.
- JKO was too long and painful after an hour or two listening I realized I didn't retain anything.

Were these activities valuable; why or why not?

- Yes they were. However they seemed more focused on higher ranking personnel.
- Yes because it gave me a perspective of working in a joint/multinational environment.
- Yes, it provided good fundamental information on joint task force operations.
- Yes, necessary for annual training and foreign travel.
- Yes. General awareness
- It was a wider “shot gun” blast of information about each field, not very specific.
- No. Joint Targeting course did not provide the fidelity necessary to actually conduct targeting.
- They were and I believe I would have gotten more out of them if I was informed earlier to take them
- They were largely a waste of time for “Exercise” purpose for real world JTF/ deploying ops. They would be a lot more

What different and/or additional pre-exercise activities would you recommend?

- None
- Bringing KM in earlier
- The pre-ex activities I would recommend are simply drills for each directory.
- Having the road to crisis exercise brief in advance would have been good. I was a last minute billet fill and did not get this in advance.

- Accessing the collaboration tools and using them
- All necessary staff sectors were covered.
- There should be time dedicated to build teams, identify systems, regard and expectations in a collaborated environment at the directorate/shift level.
- Some sort of training to resolve the large problem with the RFI process. Many RFI's routed were not drafted at the level they needed to be routed into the CENTRIX system. RFI quality was a major shortcoming!
- More OJT for the position assigned.
- More information as to what is going on.
- Send CBT list our prior to exercise so more time can be taken to learn them
- I would recommend a JIPOE online class
- We should use actual systems / computer applications to be used during exercise
- None- Adequate training was required and/or available
- Table top on communications would be helpful
- Same, more "CAC responsibilities"
- In person training. There are three full days prior to StartEx in which someone could lecture in the CAC

Did you complete any relevant online courses prior to PANAMAX? If yes, what courses did you take? If yes, were these courses useful for PANAMAX?

- 13 mods of JTF 101
- Not specifically for PMX, but Jecc personnel are always prepared.
- Yes, JTF 101 modules, human trafficking/ATF. The course was useful
- Information assurance, human trafficking as a part of our yearly General Military Training.
- No
- No, I didn't complete any.
- No
- No
- No. Again, I was only recently told I was participating.
- None
- JTF 101, SERE level A. No courses or activated attended other than the CAP for situational awareness. I am an E-6, there-

- fore options/funds are limited.
- All vary GMTs. Too many to remember.
- Yes, NKO courses
- No
- Yes, online course. It was somewhat relevant but it should be more focus on our command and AOR.
- I finished AirCommand Staff College (ACSC) this spring 2012- it covers joint planning
- No
- None
- No
- PANAMAX required training on SC portal. Very helpful
- Not aware any were available to reserve officers. Website? OWA?
- JKO- I started the required 3 but didn't finish them, I didn't feel like I was learning and it was very time consuming.

If you could improve one or two aspects of online training, so that it better prepared staff for exercises like PANAMAX and related operational duties, what would you change and why?

- Have or create that focuses on lower ranking personnel.
- Bring KM early and after.
- I would possibly add a language intro course or at least be provided access to a Rosetta Stone course
- None
- Having a central point to access all the necessary courses
- More notice about which classes need to be completed in the weeks before "deploying" to support PANAMAX
- I don't know
- I would have insured more lead time and diversity where the classes can be accessed. As a marine, I go to MARINENET to find classes for personal Pme. I ask to create a sko account. I believe the sites are able to link courses.
- There MUST be away to train and test inject personnel on JTF CMD SOPv, TTPs, and formats.
- Have a bit more interactive modules. The classes are quite long and boring.
- When building a Jmo, try to utilize peo-

ple that have experience in that field. I have zero collections experience, but apparently that is plenty to be a JTF collections manager (nights).

- Make the lessons more interactive rather than test based. For example the IA v10 course is interactive and has no test. The student is not focused on just answering the question.
- More interactive and easier to navigate and learn areas where not proficient
- I would add an online JIPOE with focus of our AOR. The online course was long and painful and at the level of the course it should have tailored to your position E-3 m-E-6 don't care about strategic planning but the 0 grade in planning the class would be good but JIPOE for the worker would be best.
- A little complicated but maybe-create module position-specific to run through scenarios to help understand how to handle issues of that particular position.
- Nothing to add, I liked the warm-ups like DCO's
- Ensure that all or most of the players participate in the warm-ups.
- Nothing- The online training was great- A table top exercise pre PNMX would be helpful to ensure all communication socialized.
- 1. Shorten it 2. Tie it to Southcom products (OPORD, CONOP, EXORD)

Any other comments about the pre-PANAMAX work-up or staff training and education, in general?

- I think that some of the staffing could be beefed up such as personnel to aide camp commandant
- It is difficult to access these courses remotely from home with the current common access card (CAC) software. It rarely works from home if at all. There needs to be improvements in this software to be able to be used on most legacy Microsoft software (As most people do not update their personal home software or hardware as much as the military does).
- Ensure people establish accounts prior to the exercise and go for a spin/dry run around the site.
- I am so ready for PANAMAX 13
- Pretty good exercise overall.
- Too many surveys!
- I am a reserve IMA STA attached to US

southcom so I have a little to no contact with the exercise prior to start ex. I typically have one or two days prior to read up on exercise

- Thank you.
- The portal is inundated with information, it's too much. I think pre-exercise training could also just convert a required reading (OPSUM, OPORD, COMP, etc.)

Joint Mindset Survey

This section lists the aggregate means and standard deviations on the Joint Mindset survey. All participants (experimental and control) completed this survey at one point, during the study.

Joint Mindset Questionnaire Outcomes

Key:

1 = Weekly

2 = Monthly

3 = Yearly

4 = Every few years

5 = Never

Questionnaire Items <i>"Consider how often you generally experience each"</i>	<i>M</i>	<i>SD</i>
1. Desire a leadership role in a project or mission.	2.53	1.38
2. Receive formal instruction addressing Joint principles and procedures (class or online).	1.90	1.11
3. Learn new Joint principles and procedures (through instruction, discussion, or reading).	2.17	1.11
4. Receive formal instruction addressing Joint values and ethics (class or online).	1.71	1.01
5. Outline specific ways that an OPLAN or CONPLAN affects other US Services/agencies.	1.78	1.27
6. Outline specific ways that an OPLAN or CONPLAN affects others outside the US.	1.73	1.37
7. Seek out information about activities and missions occurring outside your own unit.	2.41	1.47
8. Use strategic documents (e.g., National Security Strategy) to make decisions.	2.07	1.41
9. Use Joint pubs and handbooks to learn and practice Joint terminology.	2.38	1.30
10. Use Joint pubs to learn and practice OPORDs, CONPLANS, and OPLANS.	2.03	1.33
11. Use Joint pubs to learn and practice Deliberate Planning and Crisis Action Planning.	2.03	1.38
12. Use own-Service specific language or slang around coworkers from other Services.	2.93	1.33
13. Learn about and/or discuss other Services' cultures.	2.94	1.23
14. Learn about recent/historic military operations.	2.32	1.24
15. Use suggestions from personnel in other branches when creating orders and plans.	2.50	1.28
16. Have a different perspective than personnel in your Service when creating orders/plans.	2.37	1.37
17. Have a different interpretation than personnel in your Service of guiding materials/docs.	2.38	1.34
18. Do your coworkers at your current duty assignment generally exhibit Jointness? (No =1, Yes=2)	1.84	0.37
19. Do you have a different interpretation than coworkers of Joint values and ethics?	2.12	1.54
20. Do you have a different interpretation than coworkers of Joint policies and procedures?	2.12	1.49

Stakeholder Knowledge Elicitation Semi-Structure Interview

This section lists the initial interview script used for the semi-structured stakeholder interviews, which were conducted during the front-end analysis. This script helped initiate the conversation, but then stakeholders were encouraged to provide additional comments throughout the discussion.

1. How many online courses does (*your organization*, e.g., TRADOC) currently support?
2. What major obstacles do your personnel usually experience with online training? Can you give us some examples?
3. How are your online courses aligned with field manuals and future events, such as upcoming training events or specific operational activities? Can you give us some examples?
4. What percentage of the courses are aligned in this manner (versus developmental courses, like the action officer development course, or compliance-oriented courses, like alcohol and drug awareness)?
5. How do you measure for knowledge transfer in your courses; do you assess higher-levels of cognition? Can you give us some examples?
6. What's your sense of personnel's general outlook towards online training? Does the culture seem to treat it as an additional burden or as a value-added instructional opportunity? Can you give us some examples?